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Philadelphia. Councils. Railroad Committee.
Title:
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The Trolley System.

STENOGRAPHIC REPORT

OF

TESTIMONY OF EXPERTS

AND

ARGUMENTS

OF

RUFUS E. SHAPLEY, Esq.,

AND

JOHN G. JOHNSON, Esq.,

Before Railroad Committee of Councils, Monday, March 14th, and Wednesday, March 16th, 1892.

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MEETING OF THE COUNCILS COMMITTEE

In the Matter of the Application of the Philadelphia Traction Company to Apply the Trolley System.

TESTIMONY OF MR. HAYNES, MAYOR OF NEWARK.

MONDAY, March 14th, 1892, 2 P. M.

By MR. SHAPLEY:

Q. Will you please state your experience with the trolley system?

A. We have over three hundred thousand inhabitants, with a number of streets eight rods in width, twenty-feet sidewalks on either side of the street, and ninety-two feet from curb to curb. They talked of an electric road in such a way that caused me a great deal of anxiety. At my own expense I have visited a number of cities where these roads are in operation. Four years ago I was in Richmond. I visited Boston, Pittsburgh, Rochester, and Chicago, where they have a different system—where they have the cable system. They talked about rapid transit. Rapid transit there means going fast around the corner on the main street, and I think the record has been there that they killed about one man a week for the past year. That is in Chicago, with the cable system, not with the electric. Everything that has been said by the mayor of Boston I can vouch for by my personal knowledge. I went there, not under the guidance of the electric people, but simply to ride over the road. There was a portion of

that road, not any part that was run by the underground system—the slot—the conduit underneath. When they reached about the Albany and Boston Depot they come into operation and run through a built-up portion of the city. That was abandoned. There were blockades about as frequently as you find in your own road here when a cable has broken a strand and you are obliged to stop. I have seen, on some visits here, where there would be two or three blocks of cars stopped. The overhead system is run on the outskirts of the city at about fifteen or twenty miles an hour. Here is an answer to a set of questions that we sent to the mayor of Rochester and he was requested to answer them, and I give them just exactly as he has answered them. I will ask the clerk to read them.

Q. Would the people of Rochester revoke the trolley franchise and revert to horse-cars?

A. No.

MR. HAYNES:—I would answer the same as to Newark.

Q. Has property adjacent to overhead electric roads depreciated in value?

A. No.

MR. HAYNES:—I would answer the same as to Newark.

Q. Does the fire department encounter obstacles in its work?

A. Not often; the wires being in the centre of the street.

MR. HAYNES:—I would answer the same as to Newark.

Q. Have there been any deaths due directly to the overhead wires?

A. No.

MR. HAYNES:—I would answer the same as to Newark.

MR. HAYNES:—There has been no loss of human life. Horses have been killed.

By MR. SHAPLEY:

Q. How many in Newark?

A. Very few. I have not a copy of the record. There was one killed the last snow storm, where one of the wires fell and killed a horse.

Q. How many miles of the trolley system have you in Newark—about twenty, are there not?

A. I think Springfield Avenue has four miles double track. I think the rapid tracks has about eight miles, and now, recently, we have opened another from the city of Orange to Market Street Depot.

Q. That is about twenty-four miles?

A. I think it is about that—double track.

Q. How long have you had the trolley in Newark?

A. Over two years.

Q. You say there has been no person killed?

A. No, sir.

Q. Any fires caused by it?

A. Not to my knowledge.

Q. Any increase in the rate of insurance?

A. No, sir.

Q. Any depreciation in the value of property?

A. An increase, on the contrary.

Q. Has it been proved a failure in the estimation of the bulk of the people at Newark?

A. No, sir. They are clamoring for more.

Q. Would they turn it out if they could?

A. No, sir. You would have an insurrection. I would not like to sign an ordinance to repeal it.

By MR. LOCKWOOD:

Q. Those horses were killed by the electric wire?

A. Yes, sir.

Q. What would have been the result if an individual had been there?

A. I have heard parties say they have taken the whole force. They informed me they have taken hold of five hundred voltage.

By MR. BULLITT:

Q. What are the names of the streets upon which this system exists in Newark?

A. From the Pennsylvania Railroad Depot at Market Street through to Irvington, about four miles. This passes through Market Street with the poles standing in the centre.

Q. What is the width of Market Street where these wires run?

A. I judge from curb to curb; it was originally laid out the same as Broad Street, but there has been encroachments, which would reduce it to the neighborhood of eighty feet.

Q. In other words, the street is about eighty feet wide?

A. Market Street?

Q. Yes.

A. Yes, sir.

Q. What other streets are there?

A. Washington Street, I think, is four yards wide.

Q. How many feet wide is that?

A. About sixty-six feet.

Q. From Orange how wide is it?

A. Through Central Avenue—it would be about the same—a little wider than Market Street.

Q. Something over eighty feet?

A. Yes, sir; or about eighty feet.

Q. Did you say that, in your judgment, the same rules would apply to put such a system in a street which, from curb to curb, was only twenty-seven feet wide, that would apply to a street that was eighty feet wide?

A. You would be obliged to use the same system, but this must have the poles that have been spoken of on the sidewalk.

Q. Do you think it would be equally desirable to have it in a street that was twenty-five feet wide from curb to curb as in one that was eighty feet wide?

A. No. There in the eighty-foot street you would have two tracks—two tracks on the wide street.

Q. Would you advise, if you were a citizen of Philadelphia, with your experience in Newark, the placing of that system in streets that are twenty-five feet wide from curb to curb?

A. If you wish rapid transit.

Q. Tell me whether, in your judgment, you would advise that or not?

A. I would advise it over anything I know of at present. I would advise the electric method of propelling cars where you have but a single track.

Q. Would you advise, in your judgment, as a citizen, the adoption of such a system where the streets were only twenty-five to twenty-seven feet wide?

A. You have only one track.

Q. Can you answer my question?

A. I would advise it where you have one track. I would recommend where you have one track.

Q. You speak of obtaining rapid transit. Do you believe that in a street which is only twenty-five to twenty-seven feet from curb to curb that you could obtain more rapid transit than about six miles an hour with safety to the citizens?

A. That question was raised when we first attempted to propel cars by electricity. The horses were to be frightened. There is not a horse at present that I have seen after a few months that has paid any more attention to it than they did to the horse-cars. If you are to have rapid transit without some disadvantages, you will never get it. I have been waiting for that good time. I waited four years to see if it was not practicable to obtain cars that would be run by the storage battery. That was my object in going to Boston, going to Richmond, to Pittsburgh, Rochester, Albany—different places—to see if it was not possible to secure something by which cars could be propelled without being obliged to use the trolley system, and I found nothing.

Q. Don't you believe you could have much more rapid transit in a street eighty feet wide with safety to the citizens than you could get in a street twenty-five feet wide from curb to curb?

A. If you were to put one track on our streets it would be just as safe where you have two tracks.

Q. You think it would be safe to run in a city built up like ours is, on Chestnut Street, at a greater rate than six miles an hour with safety to the citizens?

A. I cannot say how many teams you would have, but you cannot surpass Market Street in Newark.

Q. You have in Market Street a street eighty feet wide, and have drive-ways on either side?

A. Yes, sir; with the poles in the middle.

Q. Could you go with safety in a street like Chestnut Street any faster than six miles an hour?

A. If you got along at six miles an hour I think you will improve the transit very much here.

Q. I am not one of those persons who find very much fault with the rapidity of the present systems, because I have seen the difficulties which they have to contend with. What I want to get you to state is whether you think it would be possible to introduce any system—cable-cars, under-ground electric wires, over-head wires, or any system which, in a street no wider than Chestnut Street, built up as that is, which would be safe to run faster than six miles an hour. That is what I want you to answer.

A. That is fast enough in the settled portions of the city. But remember that we are connected with a number of cities outside of our present limits that are built up, and the cars are running to-day from Orange to the Market Street Depot at double the speed that the horses ran before it. I think they are running at the rate of fifteen to eighteen miles an hour, and you hear no complaints from the people.

Q. Is not that through a region not dense with buildings?

A. Through our suburbs.

Q. I am not dealing with them. I want you to give your opinion, as a man of business, as a man of experience, as a man who has devoted attention to this subject, as a man who occupies, as I understand, a most responsible position, I want you to give your opinion as to whether you believe that on Chestnut Street it would be safe to have more rapid transit of any kind?

MR. SHAPLEY:—It is not proposed to put it on Chestnut Street.

MR. BULLITT:—I apply that question to the built-up portion of Spruce Street.

THE WITNESS:—Six miles an hour is as much as you desire, at first, for the cars to run.

Q. Do you think it would be, at any time, safe to run through the built-up portions of a city like Philadelphia, upon a street no wider than Spruce Street, at a greater rate than six miles an hour?

A. I am convinced from what I have seen that those cars are under more control, in many cases, than the horse-cars. It can be started and stopped sooner than the majority of horse-cars running in your streets, or in any other, if necessary. There is one thing more, perhaps, that I might say. I believe your city has many streets which, from curb to curb, admit of only one track. We have a different system there. We have the double tracks. I have been a great sticker upon one matter. As they were holding those high at first, without any compensation to the city whatever, they were permitted to put them down, and the ordinance provided that they should remove them from the streets on thirty days' notice. I do not know of a man in the city of Newark who would dare to stand up and advocate at the present time that those tracks should be removed from the streets, and certainly I would not sign an ordinance calling upon them to do it, because we see what the advantage is in securing the means of rapid transit from one portion of the city to the other. They are the poor man's carriages, and formerly those who rode in their carriages now use the street-cars instead.

By MR. SHAPLEY:

Q. How far is Market Street from curb to curb—not from building to building?

A. I should judge in the neighborhood of fifty feet.

Q. And there are two tracks on Market Street?

A. Double tracks.

Q. It is your principal street?

A. Yes, sir; running at right angles to Broad.

Q. It is a crowded thoroughfare?

A. Yes, sir.

Q. Springfield Avenue is a wide street, is it not?

A. It is a street upon which they run a double track.

Q. How wide is Central Avenue?

A. It is about as wide as Springfield.

Q. I didn't hear the width of Springfield Avenue?

A. I should judge it was, from curb to curb—there is a double track on the street.

Q. About thirty-five feet?

A. I couldn't say that.

Q. It has two tracks, has it?

A. Two tracks.

Q. It is not as much as forty feet wide, is it?

A. I couldn't say. If you will come to Newark we will make the measurement, and then I can tell the actual working of the system better. I have not a cent of interest in the road. I have accepted nothing at all from the electric railroad people. I have been to see different places to try and see if we couldn't get something to avoid this bickering. I am sorry to say that I found nothing, and in the convention that was held at Pittsburgh the actual number of houses that were using this overhead or trolley system was named, and the number of cars also named, and no other system of compressed air or of storage battery that was running in a single city at a profit. On Fourth Avenue, in New York, the cars were withdrawn. Not a single one is running in the city of New York at the present time. I cannot find a case where there is a storage battery system, for that is the system that I have been looking for. I cannot find a single place in the United States where they are running with success.

Q. How long have you been mayor of Newark?

A. Eight years on the 9th. I have another year to serve.

By MR. LOCKWOOD:

Q. Is there any consideration paid for the use of the streets for any purpose—for beautifying them?

A. I have got five per cent. of their gross receipts.

Q. Have you been to the city of Baltimore?

A. No, sir.

By MR. BULLITT:

Q. I understand you to say that on some systems in Boston, according to your information, there had been no loss of life?

A. I know of no human life.

Q Do you know the West End system?

A. From the New Jerusalem? I think that runs along the new public library and Philips Brooks' church, but they have abandoned that.

Q. They have abandoned what?

A. The slot which was in the street connected with the wire.

Q. That is now operated by an overhead trolley wire?

A. Yes, sir.

Q. Do you mean to apply your remark to that road as well as others?

A. I have been all over the roads in Boston.

Q. If I were to tell you that the official report made, ending September 30th, 1891, shows that they killed fifteen persons in the previous year and injured two hundred and thirty-nine, would that be consistent with the opinion you have heard about it?

A. That is something I certainly never have heard. What was it from? Electricity or what?

Q. I am informed by Mr. Constable that an examination of the official report shows that the number of persons killed and injured on that road amounted to fifteen killed and two hundred and thirty-nine injured, during the year preceding September 30th, 1891.

MR. CONSTABLE:—The Massachusetts Railroad Commissioners have that report on record. I am now employed to examine these various schemes, and in Boston the report now is two employés, ending with the thirtieth day of September, 1891—two employés, three passengers, and ten people outside of them. The balance, making two hundred and fifty-four, were casual, some of them, and others serious.

MR. HAYNES:—How many people were injured on the horse-cars in the city of Philadelphia during the past year?

MR. CONSTABLE:—I have stated a matter which is on record. I certainly can get from the record the statement that you desire. I am giving my statement from the record, and not from hearsay.

MR. SHAPLEY:—You say that the official records show that two workmen, three passengers, and ten other people were killed?

MR. CONSTABLE:—Yes, sir.

MR. SHAPLEY:—Killed by what?

MR. CONSTABLE:—That is their record—by that road—and that is an electric road.

MR. SHAPLEY:—Do you mean to stand up here and state, or do you want the people to understand you as saying, that those people were killed by the electric current?

MR. CONSTABLE:—By the West End Railroad.

MR. SHAPLEY:—Answer the question; was it by the electric current coming into contact with the body?

MR. CONSTABLE:—I wasn't there personally and saw it.

MR. SHAPLEY:—I want to know what you mean. Do you mean to tell me that that report shows those people were killed by the electric current?

MR. CONSTABLE:—I mean to say that the State Board of Electric Commissioners have on their record that those people were killed on that road.

MR. SHAPLLY:—Does that statement mean they were killed by electricity?

MR. CONSTABLE:—I am stating the fact from the record.

MR. SHAPLEY:—Have you ever seen a record any place, or a reliable report any place, of any kind, in which they say any one was killed by the electric current on the trolley system, with five hundred volts?

MR. CONSTABLE:—I have never seen one killed.

MR. SHAPLEY:—Did you ever see a reliable statement that a man had been killed by the electrical current on the trolley system? If so, tell me where it was?

MR. CONSTABLE:—No, sir; I haven't.

MR. HAYNES:—Allow me to retract. Persons have been killed in the city of Newark, and I can tell you how it was. Two cars stopped at a crossing, guarded on the pole side. The person gets out of the car going in the direction of the other side, and then stops directly in front of the car here (indicating) and the person is killed. A child ran across the street and struck against the electric car. That child was not killed by the electric current, however.

By MR. BULLITT:

Q. I did not intend to ask you the question whether these people were killed by the electric current or not. That was

not my question. The question which I put to you was whether you had not stated—I think you had stated—that no person had been killed on that line, and therefore I put the question to you.

A. It brought out this answer to the question, that nobody has been killed on the cars by the electric current, to my knowledge, in the city of Newark.

Q. I understood you to apply it to Boston, and I happen to know this fact of which I spoke.

A. One other question was asked with regard to real estate. Since the roads have been under the control of the Essex Passenger Railway Company, on the road through Central Avenue, it diverges in front of the Cathedral, and goes down Washington Street, and those roads are to connect with the Springfield Avenue Road and run on the same track. There was a talk of taking up those tracks that would lead to Broad Street some two or three weeks, and I had the most earnest protestations against allowing the railroad people to take up those tracks on account of the increase in business that was on that line, because that track came to that point where it was leased on the Central Avenue Road.

By MR. SHAPLEY:

Q. When the proposition was first made to introduce this trolley system into Newark, did it meet with opposition?

A. It met with great opposition.

Q. Substantially the same objections to it that are made to it here?

A. I knew what the difficulty would be to put poles on opposite sides of the street over seventy-five feet. I had grave doubts whether, under existing ordinances, we had a right to place those poles there, and hence I signed the obligation where the poles must be placed in the centre of the street. The Honorable George Halsey opposed the matter, and it was decided that he had property rights even in the centre of the street. But the Legislature of New Jersey, which adjourned only on Friday last, have, I believe, passed a general law, by which those poles can be placed nearly on the line of the street, or on the sidewalk. Some of us wanted

twenty dollars for a pole here; others were more generous, they wanted ten dollars, and others wanted fifty dollars. Under those circumstances, it would be almost an impossibility to secure the right of the road to go through the city. I signed the ordinance putting the poles in the centre of the street, because I believed the Mayor and Councils had the control of the street. Application is already before the Common Council, or the Street Commissioners, for the extension of this system, and there are a number of miles to be operated during the coming summer by the electric system, overhead wire.

OSCAR D. CROSBY:—

By MR. SHAPLEY:

Q. What is your business?

A. I am the general manager of the railway department of the Thompson-Houston Electric Company.

Q. How long have you been in the electrical railway business?

A. Since 1887.

Q. What does that company do in the railway department?

A. The company sells customers throughout the world its electric motors, and dynamos to drive them, and, when desired, install the plants thus sold on the property of the railway company.

Q. By what system?

A. By the trolley system.

Q. Does that company make storage batteries?

A. No, sir.

Q. Why not?

A. They do not think they could present to investors a system that will invite one dollar of investment; nor do they feel that they could present the system that would carry the cars over all streets that are met with in most of our cities.

Q. What is the matter with the storage battery?

A. Its depreciation is too great. Professor Marks has explained that.

Q. Take the ordinary car, such as is used in Philadelphia.

What would be the weight of your storage battery, what would be the cost, and how soon would they wear out?

A. The weight would be from three thousand to four thousand five hundred pounds; the cost would be something, now, like $2000 for the batteries.

Q. That is irrespective of the motor?

A. That is irrespective of the motor. It would be difficult to tell the time during which they would do a regular service, because they have never been so continuously in regular service as to give accurate data. None have yet been made that would last longer than fifteen months, and the average life is about ten.

Q. Are these storage batteries used on any street railway in the United States?

A. I think they are used in Washington, and I think there are three in Dubuque, Iowa.

Q. Any other place?

A. And in a little suburb near Boston.

Q. Take the trolley system which you make. How many cities and towns of the United States use it?

A. In the neighborhood of three hundred. The number is increasing day by day.

Q. Name some of the most important ones which run the largest number of miles of track and use the largest number of cars?

A. Boston, St. Paul, Minneapolis, St. Louis, Cincinnati, Cleveland, Buffalo, Rochester, Toledo, Nashville, portions of Baltimore—they are not largely extended yet there; they have just got their rights. Brooklyn has a small road, but we have recently contracted a very large sale of motors for the plain streets of Brooklyn.

Q. How many miles under this contract are to be covered in Brooklyn, and how many cars?

A. I do not know the number of miles, but six hundred cars.

Q. How many miles approximately?

A. They run say three cars to the mile, and that, roughly, would be two hundred miles.

Q. I am informed that your company is only one of five companies engaged in the furnishing and construction of these electric motors for the trolley system?

A. Four or five companies.

Q. You have this contract for Brooklyn for six hundred cars?

A. Yes, sir.

Q. How many miles of streets are covered in Boston by the trolley system?

A. I suppose now there are something like two hundred and forty miles covered by electric wires, and the number of electric cars running is about three hundred and fifty. We are delivering to the West End Railway Company, which controls all the cars in the city, about twenty-five to thirty car equipments every week.

Q. You are familiar with Boston and its streets, and these lines.

A. I am.

Q. What is the character of the streets on which they run in Boston, as to width and the amount of traffic, as compared with those named in this ordinance?

A. The principal streets on which the lines run are about as wide—I do not know the exact measurement—as Chestnut Street. I suppose many people are familiar with Washington Street, which is one of our principal streets, and which is not wider than Chestnut Street; perhaps narrower.

Q. It is very much a street like Chestnut Street as to travel?

A. It is one of the most crowded streets in the country. Tremont Street, which is close to Washington Street, is perhaps one of the most crowded streets in the country, and there they are using the electric cars every day, and about four hundred thousand people are carried in that city every day, and out of that something like half are carried by electric cars, and the tendency is to do away with every horse-car, as they are increasing their electric cars at the rate of twenty-five to thirty per week.

Q. Does the trolley system in Boston run down through the centre of the city or narrow streets?

A. Yes, sir; through a large number of them—not all.

Q. The West End Company you speak of is a very large company?

A. Yes, sir.

Q. Something like the Traction Company, controlling a great many different lines on different streets?

A. Yes, sir.

Q. It has adopted this system, or is adopting it, on every line?

A. Yes, sir.

Q. How long have they had the trolley system in Boston?

A. The first cars were operated, I think, in the latter part of 1888 or the early part of 1889—somewhere along there.

Q. Take Pittsburgh. How many miles of tracks are covered by the trolley wires?

A. I should have to guess at it.

Q. Approximately.

A. I should say one hundred and fifty or two hundred miles.

Q. How many cars?

A. I remember we have delivered there to two companies about one hundred and fifty car equipments. There is another line running, say, sixty; that would be one hundred and ninety; and another line running forty or fifty; say, roughly, two hundred or three hundred cars.

Q. Is it not a fact that these trolley overhead wires and the cars operated by the trolley system are run on Smithfield Street and every street in the heart of the city?

A. Practically, every street.

Q. I mean on the main streets, in the heart of the city.

A. Yes, sir.

Q. And they run from the outskirts of that city in all directions into the heart of the city?

A. Yes, sir; and into Allegheny City and Birmingham—all over the city.

Q. What is the effect as to building up the outskirts of the city?

A. It has been very marked in building up the outskirts

and inducing the people to live there—carrying them from and to their business in the city.

Q. What is the effect in Pittsburgh and every other city you know about on property along the trolley system's line? Has it depreciated or not?

A. I know it has not. I should make a rough estimation of the appreciation as from twenty-five to thirty per cent.

Q. From the nature of your business, you must be familiar with everything connected with the effect of this system upon property.

A. Yes, sir; I am.

Q. Have you ever heard, outside of the letter of this subject recently published here, where this system has caused any depreciation in the value of any property?

A. I do not know of such cases.

Q. I find in this petition here, that it is alleged that this system involves every car dangerous to life and to limb. What is your inference in regard to it, derived from your knowledge of all the different cities in this country with which you are familiar? Is that so, or not?

A. That is not so. There is not to-day an authentic case—not a single case of a death of a human being from an electric trolley wire. I myself, like other men in the business, have received this current. It has been pretty well explained to you by others to-day, and different in the amount of current which can go through a body. The very closest and best analogy is a system of ordinary distribution. Imagine you have a pipe running along this street, in which water is carried by sufficient pumps at a pressure of a hundred pounds per square inch. Tap into that large pipe any number of little pipes an inch in diameter, and each one of these will give a certain amount of pressure or current. There is enough force in these trolley wires to kill all the people in this room—the whole outfit—if it could get into us; but as you cannot put into that one inch pipe all the pressure in the large pipe, so it is impossible to force into a human body any larger amount of pressure than the joint will give. I have myself measured the resistance of

human bodies, and the current at a pressure of about five hundred and ten units has passed through my body. It was an uncomfortable shock. I did not like it. We people in the business, who have at times to go down and handle this machinery, have some regard for our own lives, and there are millions upon millions of human beings who walk under those wires and ride in those cars, and I know of no authentic case of any one being killed.

Q. How many horses have been killed by this system?

A. I do not know. There are cases where three or four horses have been killed by the current. It may have been some higher pressure than is ordinarily used, but I think it is fair to say that three or four may have been killed.

Q. If any larger number than that had been killed—I mean a larger number in the two hundred and thirty or two hundred and fifty cities using over four thousand miles of track, would you be likely to know of it?

A. Yes, sir; and as a matter of fact all of this that I hear to-day reminds me of the pictures with which you are doubtless familiar—before taking and after taking. We go through it every time. Three or four years ago it was the same in every city we went to. That was before taking it. After taking it represents that you do not hear about these things.

Q. How long have you been in the electrical business?

A. Since 1887, in commercial business.

Q. How long have you made a study of electricity?

A. For two or three years previous to that. I was in the engineer corps of the army, and had occasion to study electricity as applied to torpedoes.

Q. I want to read from this petition which has been signed by many people, and ask you whether or not they are true in fact: "But more serious objections exists, and the use of electric motors with overhead wires upon the streets of towns and cities has created profound apprehension in the minds of the people wherever such motors have been used or have been proposed to be introduced." Is that true as to "after taking"—that is, the creating of profound apprehension?

A. No, sir; it is just in Philadelphia as it is where the

thing is not known. I live in Boston, and the electric cars are accepted as one of the ordinary facts of existence. The cars do not make any greater time down in the crowded parts of the city, where they are interlarded with horse-cars, than the horse-cars. As soon as you object to the electric cars because it is possible to run them on crowded streets at a high speed, you might as well say you object to the steam engine, because it can go at sixty miles an hour and has to run through such cities as Newark and Trenton, when they must get down to ten miles an hour.

Q. Suppose a car started at the extreme end of Tenth Street, and a passenger got on a mile or two miles below Chestnut Street, to go two miles beyond, and the ride upon the horse-car would take some thirty minutes. In what time could he make that distance by the electric car run by the trolley system, without the car being run in any manner that would be dangerous?

A. I do not know the nature of that street. I cannot tell whether it is one of your crowded streets, or not.

Q. It is a street that is not crowded. In the early morning and evening there are a great many people on it?

A. Twelve miles an hour are made on not overcrowded streets, and I know of one city where they fix fifteen miles as the speed which should not be exceeded on a street where there was comparatively small traffic.

Q. Take Boston itself—take a street-car that starts down in the very heart of the city—by the state-house, and that runs through the built-up portion of the city for a distance, say five miles. What is the average time upon horse-cars for that distance?

A. They make in the neighborhood of five or six miles in about thirty minutes.

Q. What does experience prove is the time that a trip could be made by an electric car?

A. The schedule of one of the lines I happen to be familiar with. On one of the lines in Cleveland it is nine and a fraction miles per hour. The schedule of a great many lines, and those which have a good deal of crowded traffic to support in

Boston, is from eight to nine miles an hour. I received a telegram from Boston saying the new line out to Harvard had been opened and the time had been cut down, I think it was ten minutes' run between the two points, three or four miles apart.

Q. How do the cars that are now operated in Boston and averaging that time compare with the time they made when they were running the old way with horse-cars?

A. The increase in speed may be expressed in general as from fifty to seventy-five per cent. I have run a car into the city of Boston at the rate of thirty miles an hour. I run one in the city of Buffalo at the rate of twenty-five miles an hour. We could give you any speed you want. I have run an electric car one hundred and ten miles an hour. That, however, is out of the question for a city. We will supply any speed that will suit the purpose of the purchasing company.

Q. How about the control of the car? Can the electric car, run by this trolley system, be stopped more rapidly than an ordinary horse-car?

A. It can be stopped more rapidly, and I can explain it. If you are running with a horse-car, the only thing you can do to stop your car is to apply your brakes. By every method you can apply just so much receding force by any system, whether it is an electric-car or a horse-car. But in cases of danger, where it is absolute to stop a car quickly, we have a new thing to fall back on. In one instant the whole force of the motor, which has been driving the car, can be turned on in the opposite direction. Therefore, as a matter of fact, if children were to get in front of the car, the driver makes a simple turn like that, which reverses the direction of the turn of the wheel and stops the car.

Q. So, as a matter of fact, they are safer as to dangers occurring on tracks than the ordinary horse-car?

A. They are. Take any given speed at which you are driving a car. That means a certain momentum, a certain driving force along there. That moving body can be held in check better if driven by electricity than if driven by horses.

Q. I want to read the next sentence of this petition: "The noise made by a car propelled in this way is exceedingly annoying and distressing to persons residing or doing business upon the lines of such improvements." What is the truth as shown by actual experience?

A. The truth is this: the way electric cars were first made they were a great deal noisier than the case is to-day. As a matter of fact, to-day we can take any one of you and put you in a car run by the machinery as sold now, and it will be practically impossible for you to distinguish the noise of the machinery which is doing the work above the general rumble of the movement of the car. Of course, we cannot make a car a mass of wood and iron and go over a track and make it absolutely noiseless.

Q. Take the people who live along a line of a street?

A. They simply pay no attention to it. When the cars were originally put in Richmond they made a great deal of noise. I was the general manager of the company that made the motors. Those motors were among the first that were put into service, and they gave a great deal of trouble. Now, as I say, the people who live along the lines of the railway to-day pay no attention to it whatever.

Q. They used to use, a couple of years ago, what is called the double reduction motor?

A. Yes, sir.

Q. In which the wheel run at the rate of fifteen hundred revolutions?

A. The armature, the moving part of the motor, had a very high speed, because at that time we did not know how to make it lower and get the necessary force to drive the car along.

Q. As I recollect, the annoyance and noise of the old-fashioned motor was the whirring of the armature?

A. The armature and the wheels.

Q. That is removed?

A. Yes, sir.

Q. I have heard complaints made about the hissing sound from the contact of the trolley wheel with the wire?

A. That is not a hissing sound due to the contact between the wheel and the trolley. I have known certain sections of the trolley wire to be set in vibration. It is only a sporadic case—now and then.

Q. Are there any complaints in Boston by the people who own property along the two hundred and some odd miles of streets—I mean down in the central parts of the city—about the noise?

A. No. I am perfectly free to state that the motors put in three years ago, like those at Richmond, were noisy; but they are not now.

Q. Do you happen to know what kind of a motor it is that is running on the electric road in Harrisburg?

A. They have both kinds. They have some of the old ones, and I think they have some few new ones.

Q. It is stated in this petition again that the introduction of this overhead wire will tend to cause fires and be dangerous to property in every way. What is the experience of the different cities in this country on the subject of fires?

A. I think I can answer that with some figures that were prepared by one of the officials of the company that I represent, a few days ago. I have a transcript from the fire marshal's report in the city of Boston for the years ending May 31st, 1888, 1889, and 1890, and for the period of eight months ending January 31st, 1891.

Q. This is the same report to which Mr. Constable referred.

A. It is the fire marshal's report. During this period of nearly four years there were six thousand three hundred and ninety-six fires in Boston, the causes of which were disclosed by investigation in two thousand eight hundred cases. Some of the causes are as follows: Ashes from tobacco pipes and lighted cigar stumps, seventy-nine, or two and four-tenths per cent.; rats and matches, eighty-three, or two and four-tenths per cent.; fire-crackers and fire-works, one hundred and four fires, or three and one-tenth per cent.; gas jets explosions, one hundred and nine, or three and two-tenths per cent.—after some seventy years' development of the gas business; defective flues, one hundred and sixteen, or three

and six-tenths per cent.; bon-fires, one hundred and thirty-five, or three and nine-tenths per cent.; sparks or heat from furnaces and steam-pipes, four and one-tenth per cent.; overheated stoves, four and three-tenths per cent.; matches in hands of children, eight and one-tenth per cent.; kerosene lamps, nine and three-tenths per cent.; electric wires, one and six-tenths per cent.

Q. That includes electric light, wires and all?

A. Everything in the city, with the general tendency in many of the people to blame the electric wire for everything.

Q. To what extent are electric wires used?

A. Very large.

Q. The same as they are here?

A. Yes, sir.

Q. Overhead wires?

A. It has this whole mileage of two hundred and forty miles, or whatever it may be, of electric road.

Q. I mean electric light wires?

A. Yes, sir; largely.

Q. Do those reports state how many of these fires were caused by the trolley wire?

A. I do not know as they are distinguished, one from the other.

Q. There was a fire occurred about three years ago, which was mentioned by a gentleman here, Mr. Constable. He stated in a very positive way—it was Mr. Atwood Smith—that the experts among insurance people had come to the conclusion that it was caused by a trolley wire falling on an electric time wire.

A. I heard about it, and I inquired into it. I lived in New York at the time. There was a general cry at first that it must have been the trolley wire. That was the general tendency three years ago, to lay every mysterious fire on the electric wire.

Q. And the insurance people endeavored to create that impression?

A. It was one of those fires whose origin was not authentically determined. I cannot say it was not the trolley wire, and I cannot say it was.

Q. It has been stated, by the opponents of these ordinances, and it was stated here substantially by Mr. Atwood Smith, that the insurance companies, if this system were put up in Philadelphia, would be compelled to increase the rate of insurance. Do you know whether the rates of insurance have been raised in Boston, Brooklyn, Baltimore, Pittsburgh, St. Louis, Cincinnati, or any other city in the United States, on any property on the line of streets on which this system runs?

A. I do not. I cannot recall any instance now in which that is the case. I can well understand that the body of underwriters would take alarm. Their first move is self-protection. They say we will put the rates up, and if it does increase fires, we are safe.

Q. Another objection I see these objectors make is, in case of fire "the interference with the efforts of those engaged in extinguishing the flames has proved to be a most serious obstruction." What is your experience as to that?

A. The obstruction has not been a serious one. I think I can say that the electrical fraternity and railway companies have the good-will of the fire department in all cities where they are used.

Q. How do the firemen manage, in case of fire, as to the telephone wires, and electric wires, and trolley wires.

A. The bare trolley wire is not often seriously in the way because it is in the middle of the city. If it should be necessary to cut the wire they can do so. Some of them are supplied with rubber gloves. And they can call the linemen to cut them.

Q. A great deal has been said here about the conduit system, which is said to work in Buda-Pesth. Are you familiar with it?

A. I am familiar with the printed reports on the matter. We have had some reports from our European correspondent.

Q. Has the conduit been tried in this country?

A. Yes, sir.

Q. Where?

A. At Allegheny City and in Boston.

Q. A considerable amount of money was spent in Pittsburgh?

A. Yes, sir.

Q. About $100,000 or more?

A. Yes, sir. We purchased the company that did that work.

Q. What was the result of those experiments?

A. That the engineers who put forward that system, and the people in it, are to-day at all times stating that it is practically out of the question to make conduit system that will be satisfactory.

Q. What are the practical difficulties in the way?

A. You have the hole in the ground. There are two ways of making a circuit—one with the ground and the other by returning it over a wire. In using the ground you have the earth itself, which corresponds to the wire. In the conduit system this would be in a gutter, and you have two conductors which are carrying a current with a pressure of five hundred volts, and if your joints are bad, and they are practically destroyed in this case, because of the moisture and the snow—and the small boy will put a knitting-needle down the slot, and drop things in to see the effect of the force work—the earth would conduct this voltage into it. Then, again, there are topographical conditions wherein it would be simply out of the question to get the drainage. I remember in New York City, down in West Street, being in charge of a shop there, where sometimes the water in the sewer backed up so that there was practically no drainage.

Q. If the Buda-Pesth system, or any conduit system—the one devised by Mr. Marks, for instance—could be made to work, wouldn't your company take it up?

A. If we could use, commercially, any of the conduit systems, we could save a great deal, and I should be out of my place to appear before you to-day. It is certainly worthy of some record that those who have spent millions and millions of money in this business and to whose very interest it is to offer that system which will meet with the least objection, have not themselves been able to offer that system.

Q. What is your general experience as to the trolley giving satisfaction?

A. It has been a satisfaction or we could not have so many miles of it in operation. We could not do a business which has grown beyond our ability to care for it.

Q. Have you ever known of a road on which this trolley system has been put, on which it has been abandoned; if so, what?

A. I think some of the very early efforts have been abandoned.

Q. I am speaking of more recent times.

A. None of those which have gone in in the last two years.

By MR. BULLITT:

Q. Do you think that there is any objection to overhead wires in narrow streets in cities?

A. Yes, sir.

Q. Will you state some of them?

A. The objections that would be raised, in the first place, against anything that is put up, and the objection—it can best be explained by this model. It is objectionable in a certain sense. For instance, I would not want any smoke on the locomotive which is going to take me back to New York this evening. This is a life of compensation, and in getting clean, pleasant, well-lighted cars, that move rapidly, there is a compensation far in excess of what you pay for it.

Q. Is there any danger of any kind, either to persons or to animals, from the stringing of these wires across our streets?

A. The danger to persons will be limited to the shock, such as I have described, if they occur at all.

Q. Is there any such danger?

A. Employés get the shocks constantly.

Q. Is there any danger to individuals walking along the street?

A. To say there is absolutely no danger would be to strain language. There is danger all the time, everywhere. There is danger of your dying; there is danger of this roof falling in.

Q. I ask you whether you think there is any danger of any kind connected with the overhead wire?

A. I think there is a possibility of danger, but it is of so small importance that it is practically not a danger worth considering.

Q. Do you consider that the trolley wire is as harmless, or more so, than others?

A. It is very much less harmless than some, and as to the danger to human life no more harmful than any other.

Q. Is there any liability in a storm throwing down the wires, of the trolley coming into contact with other wires and thus produce a liability to fire or to personal accident—has the trolley anything to do with the liability in that way?

A. If it is a bare wire, when most of the other wires are covered, there is some danger in wires falling.

Q. Is there any danger from the trolley wire breaking from the fact that the trolley is always working on that wire, and that the friction causes it to break?

A. No.

Q. No danger of that sort?

A. No, sir. The trolley could not very well break the wire. The trolley presses up against the wire.

Q. But does not that friction produce any wear on the wire?

A. Yes. I suppose at the end of a thousand years it might wear that pulley through.

Q. You think it is practically nothing?

A. I think it is practically nothing.

Q. Is there not a peculiar liability to danger from the breaking of wires during a sleet storm?

A. There is a greater strain upon a wire in a sleet storm, and the sleet lodges upon the wire.

Q. You are familiar with the accidents that occurred in Albany last winter a year ago. Was there or was there not quite a number of accidents in the shape of fire occurred from that cause?

A. I do not know. I was living in New York and Boston.

Q. You made no investigation at that time of the alleged accidents in the city of Albany?

A. I was living there and did not make any investigations.

Q. Do you know that was charged?

A. No.

Q. Never heard anything about it?

A. No.

Q. Then you are entirely ignorant of what occurred in the city of Albany, in the winter beginning December, 1890, and ending March, 1891?

A. No. All that I know about Albany is that it is a place where we sold a great many electric cars, and are selling more every day.

Q. You don't know anything about the accident that occurred.

A. No, sir.

Q. And the disturbances that occurred?

A. No, sir.

Q. Is there any liability of the trolley cars being disturbed in their motion and stopped during the trouble with the storm?

A. There is a liability; yes, sir.

Q. Is it not very frequent?

A. No, sir.

Q. How often do you know it to occur?

A. It has certainly occurred. I do not know how many times.

Q. Have you not noticed it occur frequently during the last month?

A. No.

Q. You think there is liability through storm?

A. Yes, sir; I said there was.

Q. What is that?

A. I could not express it in any more accurate way than I have done. There is that liability, and I believe all of you would say that if it was very great we could not do our business.

Q. When was this electric system by trolley first noticed?

A. I think Mr. Siemens was among the first; that was some twelve years ago. As to its introduction in any commercial way in this country, which dates back to something

like 1884 or 1885, when the first experiments were made. The Richmond road, which has been adverted, gained its prominence because the system was applied under great difficulty and on a larger scale than had at that time been attempted, and while its record was one of a great deal of trouble for those who were connected with it, it has been made the turning point for the electric car.

Q. When do you consider this system became a commercial success?

A. In the early part of, say, 1888.

Q. Up to that time how many roads were in operation under this system?

A. Ten or twelve, probably.

Q. The people who entered into that experiment were generally people of capital.

A. They were men in small cities.

Q. They believed in making this a success?

A. Unless they were protected by guarantees of the manufacturing company, that I do not know. I was not connected with the company.

Q. The assumption was they could make it a success?

A. They must have had some confidence. You can judge that as well as I can.

Q. Do you not know that people very often enter into enterprises of that sort which, to a very large extent, prove to be failures, who are very good business men themselves and waste their money in things of that sort?

A. Yes, sir.

Q. Do you consider you have this system of trolley wires in a perfect state of operation?

A. No, sir. I should want to leave the company if I thought we were not going to get on in our progress.

Q. Do you believe this system of passenger cars by electricity will be so much improved in the next two years or five years as it has been in the last five?

A. No, sir; because in the last five years it was not much more than a mere experiment, and to-day it is a certainty.

Q. If a system of underground or conduit wires could be

adopted, would you consider it an improvement upon the overhead systems?

A. If it could be adapted to meet the commercial wants, of course.

Q. Wouldn't you consider that it would be a very great improvement in streets as narrow as ones where there are so many overhead wires?

A. It would be preferable; certainly.

Q. There is no question about that?

A. None in my mind.

Q. Do you know anything about the character of Mr. Siemens, the man who is said to have invented this Buda-Pesth system?

A. I do not know him personally. I know Mr. Siemens.

Q. Is not his firm at the head of the electrical business of the world?

A. No, sir.

Q. Where do they stand?

A. The head of the electrical business of the world is in America.

Q. Where do they stand in Europe?

A. There they might probably be said to be at the head.

Q. Was not Mr. Siemens practically the inventor of the trolley system?

A. No. No one has been the inventor of the trolley system of any definite point. There was an electric road running as early as 1884--not a trolley system. But he was the first one who run it.

Q. Was not Mr. Siemens the man who practically introduced the trolley system into use?

A. That comes pretty near being a fair statement of the case. He directed more attention to that by what he did, I think it was twelve years ago, than had been done previously. The art has not developed in Europe.

Q. What do you know of his reputation and his success in that line? Would you give credence to a statement made by him, or by those who succeeded him, the firm of Siemens

& Holske, that they had succeeded in accomplishing the system that gives good results in Buda-Pesth ?

A. I would give it all the credence to believe that he has achieved good results under those conditions.

Q. Is it not probable that if they have had that system in operation for two years or more, and have put it in at a cost of $20,000 a mile, because that seems to be the statement—and that it is a success—you have no knowledge that it is not ?

A. No. I should want a great many facts. The word "success" has a whole range of meaning.

Q. Have you made any investigation into that Buda-Pesth system ?

A. We have reports from our correspondent in Europe, and are waiting to hear more from it.

Q. Taking the topographical conditions that exist in Buda-Pesth, which I understand ought to be considered, and taking the report which you are getting in reference to the system, have you any reason to doubt that it is a success ?

A. I have not any reason to doubt, because I do not know what it has cost to do it.

Q. The question is whether you had any reason for doubting it, from anything you have heard adversely ?

A. I have heard this : I have heard that the government of that particular province has prohibited the offer of the sale of the bonds of that concern to the general public.

Q. Have you heard why ?

A. They said this thing is purely experimental. If they offer it to the public, they do not want the public to take stock in an enterprise which was not beyond the experimental stage.

Q. From all you can learn from that, will you say that you know knowing but that it is experimental, and, therefore, you do not know whether it is a success ?

A. Yes, sir.

Q. You referred to the speed at which cars can be run. I understood you—and I may have misunderstood you and would like to get right about it—that in the densely populated portion of Boston, in the narrow streets there, their speed was not over six miles an hour ?

A. On Tremont Street it is not anything like six miles an hour. Cars crawl along, eight and ten cars to the block.

Q. How far does that slow speed extend ?

A. Five or six blocks.

Q. Does the rapid speed not begin until you get into the wide streets ?

A. Yes, sir. It is not a question of the width of the streets, unless in so far as the traffic in those streets affects them. It is not a question of width, but whether a body can move along there.

Q. What I want to get at is whether those cars move at any greater rate than six miles an hour, or whether they move at less in the densely populated part of the city, and, if so, under what conditions ?

A. Using the words "densely populated portion" in a very restrictive sense, I should say, no. We might have different ideas of what "densely populated" is.

Q. How far do the cars run in streets as densely populated as Chestnut Street ?

A. Miles of them.

Q. Give me the streets ?

A. Washington.

Q. How far do they run on Washington Street ?

A. I think something like a mile and a half.

Q. Where do they begin ?

A. They run—I do not know the name of the street. You know where Albany Street is. I should say it is about a mile, or a mile and a half.

Q. What other streets ?

A. On Tremont Street.

Q. How far ?

A. Say a mile. I am not exact now.

Q. Where else ?

A. On Winter Street. And they run on a number of tortuous streets, the names of which I do not know.

Q. Is not the portion of Boston that is occupied by

residences of Boston proper, comparatively limited by reason of the water which is around it?

A. No. There is not any city in the country that has the extent of suburbs that Boston has.

Q. I am speaking of the city proper.

A. There is one very large area there which is called the Back Bay District.

Q. That city has very wide streets?

A. Newbury and Marlboro—as wide as those.

Q. Are not most of the avenues through that portion of Boston wide?

A. No, sir. Commonwealth is the only one of an extreme width.

Q. What is the width of the avenue at the Hotel Brunswick?

A. It is a street not wider than Chestnut Street.

Q. From curb to curb?

A. From curb to curb. You have the idea of great width because it is opposite the School of Technology, and there is a great open space there.

Q. How is it opposite Mr. Brooks' church?

A. There is an open space again and a little square called Commons Square.

Q. It runs along Boston Commons, does it not?

A. Yes, sir.

Q. And along the new public gardens?

A. Yes, sir. There is a great fight in Boston as to whether they can take any of the Commons for street purposes.

Q. Is it not a fact that the population of Boston largely comes into the city in the morning and goes out at night?

A. Yes, sir.

Q. And, therefore, is it not a fact that these means of access create the demand for rapid transit?

A. Certainly. That exists in every great city where we go.

Q. Is not that particularly so in Boston?

A. I should say that I believe the suburban population of Boston is perhaps a little larger in proportion to the city proper than in most cities.

Q. Is it not a great deal like the city of New York, where the people pour in in the morning and out in the afternoon?

A. Yes; and there is a great population lives within walking distance of their offices.

Q. You take Pittsburgh, where you say these narrow streets are used. Are not the streets within the heart of the city of Pittsburgh very much confined by the hills, and is it not true with reference to Pittsburgh, as to Boston, that this system of rapid transit into and out of the city is very much more in demand than it would be in the city of Philadelphia, where the streets run at a great distance in every direction?

A. I think from the fact that Philadelphia is spread out is one of the reasons why it would be after rapid transit.

Q. You have spoken of some two hundred and fifty cities that are using this trolley system. Can you tell me some other cities except Boston and Pittsburgh in which this system is used with streets as narrow as ours?

A. Yes, sir. I could do it off-hand—Richmond and Scranton. Harrisburg I am not familiar with.

Q. As a rule, the trolley cars are run upon wide streets?

A. No, sir. They go on the most traveled streets.

Q. Are you not aware that in almost all the cities you have referred to the streets are wide?

A. I am not certain they are as wide as Philadelphia. I know that you have particularly narrow streets as compared with some.

Q. As compared with most of the modern cities of the country?

A. No; I do not.

Q. I understood you to say that you did not know of anybody that had ever been killed, or that you did not think there was any danger connected with the trolley wires. I want to read you what I saw in the papers, and I ask you if there was any danger in that? (Mr. Bullitt reads from the issue of the Philadelphia *Ledger*, of December 23d, 1891, which stated that in New Albany a man named Lewis Hacker was injured by electric trolley wires, and was not expected to recover.) Did you see that?

A. Yes, sir.

Q. Did you know anything about it?

A. I know this about it. That that New Albany incident, and one time in Michigan, were both paraded very largely to the public press as being instances of the killing of people by the trolley wire. I know that at the time some electrical man made it a point to get at the facts surrounding those two instances. This was after the New Albany incident, and this other one at Grand Rapids, or some other town. And his conclusions were that there had been no authenticated case of a death from trolley wires.

Q. Let me read another one from the *Philadelphia Record*, of November 21st, 1891. (Mr. Bullitt reads from the issue of the *Philadelphia Record* of that date concerning a man named George Sullivan, in striking a nail and hitting a trolley wire, which doubled him up and caused him to fall down.)

A. I know nothing about the incident. That is taken from one of the papers of the day.

Q. What I want to get at is this: This states that he fell backwards in striking on a live wire, with the back of the neck, and that he was thrown in the air. Is that likely to ensue from such a thing?

A. I can only speak from my own personal experience and seeing men getting this shock and getting up and using strong language.

Q. If a man happened to be at an elevation of fifteen or twenty feet and received such a shock, would he be able to get down, or not?

A. When he releases his hold the shock ceases.

Q. Then you do not feel there is any danger, particularly to a man who receives a shock in the air at that distance?

A. The fall might hurt the man, but I do not think the shock would kill him.

Q. You were asked in reference to the noise made by the trolley cars. I understood you to say there was a noise which was most annoying at Richmond, if I recollect aright; but that has been done away with since, I understood you to say?

A. Yes, sir.

Q. Now, is there not a certain amount of noise from the wheel running on the wire?

A. Yes, sir; that is true. There is a certain amount of noise.

Q. Is not that one of those things which is disagreeable and offensive to hear?

A. I can only answer, if you will allow me——

Q. Suppose a person living in one of our streets during the summer had the window open—a second-story window, being removed from the trolley over twenty-five feet—would that or not be audible to the person in that room?

A. I think in some cases it would be and in some it would not.

Q. Do you mean to say that some trolleys make a noise and some do not?

A. That is what I mean to say. Of course, there is a noise made by every car. We know that all cars make noise and the horses make a noise, and the noise of the trolley wire itself is such that it is swallowed up in the noise that is made by the car.

Q. If they were opposite the sleeping rooms of a house, would it not be likely to affect the persons living in that house?

A. No, sir; not at all.

Q. You have heard the cable on Market Street. Do you mean to say that the trolley wire is not more offensive to persons in the second-story?

A. I do not know how offensive it is to you, but it is not to me. I have slept in a room—a front room, in a house on a street not wider than this—Chestnut Street—with a double line of cars passing it, and I can only say that the noise from the trolley does not affect me.

Q. Do you hear the noise?

A. I do.

Q. Is there any liability to a hissing of sparks from the trolley?

A. Yes, sir.

Q. At what times are they more noticeable?

A. They may be on all the time.

Q. When can they be seen best?

A. At night.

Q. To what extent do they exist? Is it not caused by their being a little hiatus in the electrical wires?

A. If there is any roughness in the trolley wire. If there is any snow, there may be an induction of the spark between the wire and the trolley.

Q. Do you or not believe that in two years from now we will have a system of propulsion by electricity which will be free from very many of the objections which now exist?

A. I do not believe that. We are trying to do what we can to improve it. In all these five years there has been a large improvement in the trolley system.

Q. Has there ever been any subject that you know of in which the human mind—the scientific mind—is more exercised than it is to-day in experiments in electricity?

A. No.

Q. Are not the improvements which are being made in the power of propulsion by electricity probably the most important that are being made to-day?

A. Yes, sir.

Q. Is it not, then, probable that in two years from now there will be much greater strides made than have been made in the last five years?

A. In what direction?

Q. In the improvement of the system of propulsion and the removing of the objections which now exist?

A. We make great strides all the time. It is perfectly impossible for me to stand here to-day and say to you or anybody else that I can look in the future and see what will happen two years since. We are trying to make improvements all the time.

MR. GEORGE WESTINGHOUSE.

A painter was painting a building in Pittsburgh, and something gave away and he fell down on a high-tension wire and saved his life.

By MR. BULLITT:

Q. Is this the case I read from the *Record*?

A. No.

Q. You do not know about Sullivan being done up?

A. No. If he fell and did not have his foot on anything he would not get a shock.

Q. You do not know anything about this case?

A. No. I only know of the other where a live wire saved the man.

By MR. SHAPLEY:

Q. What is your business?

A. I am the inventor of the air-brake and connected with electric companies.

Q. You are connected with the Westinghouse Company?

A. Yes, sir; we manufacture motors and generators. The trolley wires are generally put up by the companies that put up the railways.

Q. You are thoroughly familiar with the trolley system?

A. I am, comparatively so.

Q. And all motors connected with the electric roads of this country?

A. Yes, sir.

Q. You live in Pittsburgh?

A. Yes, sir.

Q. How long have you been running the electric cars in Pittsburgh? When the attempt was made to introduce that system was it received pleasantly by the people?

A. They did not care anything about it there.

Q. They are more progressive there than here?

A. Yes, sir. The only thing that surprises me is that this meeting should not be the other way—to compel you to put it up.

Q. Do you think the people of Pittsburgh could be induced to have it taken away?

A. No.

Q. There are a couple hundred miles of it, I believe, in Pittsburgh?

A. I should hardly put it at as much as that.

Q. In what streets is it ?

A. It is all over creation. The Penn Company took every street that was not taken by the other company, and they have it from points in Allegheny, Manchester, and up on the hill. They run it up at twelve per cent. grade, away out at East End, at Greensburg. They have taken a great deal of Pennsylvania Railroad traffic. The people get on the cars and come down quickly and comfortably and go back again.

Q. Is it not a fact that almost all the suburban lines that bring people in run right down into the very heart of the city, in almost every important street in the centre of the city ?

A. Yes, sir ; at high rates of speed ; and it used to be a very common thing for people to get out from behind the horse-cars—people in carriages. Since they have the cable and electric cars there everybody gets out of the way of them at a higher speed.

Q. Fifth Avenue is the principal business street ?

A. Yes, sir.

Q. That is a little wider—not much—than Chestnut Street ; and Smithfield Street is about the width of Chestnut Street.

A. Yes, sir. It has two tracks, and the wagons can hardly pass along the side. A wagon can turn out to the right or to the left so a car can pass. And it is so on Penn Avenue.

Q. That is another principal street ?

A. Yes, sir. They run it at about eight or nine miles an hour.

Q. What has been the gain in speed, taking all the electric cars as a whole, and comparing them with the horse-cars ? What has been the gain in speed ?

A. I should say it was double.

Q. In other words, they make the same distance in about one-half the time ?

A. Yes, sir.

Q. What has been the effect on the suburbs ?

A. Enormous. It has added so to the convenience of the people that a person who wishes to go down can get in a cable car or electric car at his door, and go to his very place of

business, and many people go that way instead of taking the Pennsylvania Railroad.

Q. What has been the effect on the property through which it goes ?

A. We are suffering from a new assessment ; and judging by its increase, property has gone up four-fold.

Q. So there is no depreciation ?

A. No, sir.

Q. What has been the danger to life of passengers or people crossing the street from the electric current ?

A. None that I know of.

Q. Any horses killed there by the current ?

A. Yes, sir ; but I do not think it is the one-hundredth part of the horses killed on the horse-cars, if you take that standpoint.

Q. Have you ever heard of the rates of insurance being increased on any property along those lines ?

A. No. There is an agitation going on.

Q. Insurance companies are trying to increase the rates ?

A. I think in some cases it might increase—in some exceptional cases.

Q. Are you familiar with the trolley system in Boston and other cities ?

A. I have seen it there.

Q. Another objection has been made on the ground of noise. What is the experience of Pittsburgh people as to noise ?

A. We have some motors there that are noisy and objectionable, but they are putting on other motors that are so noiseless in their operation that the objection is removed.

Q. That the new motor ; does that make any more noise than is made by the horse-car ?

A. Not so much. I think the noise of the horses' feet on the cobble-stones—on the pavement—is much greater than that of the electric cars.

Q. There has been a great deal said about conduits to-day. You ought to know all about them ?

A. I ought to. The conduit has to be made of iron and

made strong, and the wires, when they are laid inside, are likely to leak into this iron conduit, and if there is a horse steps on them and gets on the rail it will receive a shock.

Q. There was an experiment made in Pittsburgh or Allegheny City with that?

A. Yes, sir.

Q. Were you in that?

A. Yes, sir.

Q. It was abandoned as a complete failure?

A. Yes, sir.

Q. After spending a good deal of money?

A. Yes, sir.

Q. What were the practical difficulties that were found there?

A. The leakage and burning out. Putting the electricity up in the air is best. Air is the best insulator known.

Q. There is some talk about the danger of fire to houses. Would it be possible for a current of five hundred volts, supposing the insulation of the span wire was broken, and the current passed over the span wire to the poles and disappeared in the ground, would it be possible for the current to leak through the pole into the air across the distance of the pavement into the house?

A. No; it would not go through the air the space of one-sixteenth of an inch. Fires are more liable to be caused by the heavy wires coming into contact with the lighter ones—the telephone wire.

Q. That is to say, the accidents that have happened and are spoken of, as to fires, have occurred from the electric light wires coming into contact with——

A. Telephone wires.

Q. And therefore on streets on which there are none of these wires there would be absolutely no danger from fire?

A. Absolutely none.

OSCAR B. CROSBY, recalled:—

By MR. BULLITT:

Q. Will you state whether on streets where the trolley system is, where there are other wires ranging from ten to forty, you ought to have your wires protected by guard wires?

A. Where those wires are parallel to the trolley wire, it is not necessary, because if these wires fall, they won't fall on that wire. With regard to putting guard wires at certain intersections of the street, it is a question that the engineer in charge of the insulation will judge, as he goes from point to point along the line.

Q. It is a question of judgment for the engineer.

A. Yes, sir.

GEORGE WESTINGHOUSE, recalled:—

By MR. SHAPLEY:

Q. Do you know, or is it known to any men in your business, of any other system than this trolley system—this overhead wire system—by which street cars can be propelled successfully?

A. I know of no other system. I think the storage battery system which has been alluded to is impracticable. I had one of the first out, and the rapid deterioration of them convinces me that it was an impracticable device, either for lighting or power, and I think if the people wait for more comfortable cars and higher speed that the storage battery won't supply it.

By MR. BULLITT:

Q. Pittsburgh is bounded by the Allegheny River on one side and the Monongahela on the other, and very high hills all around.

A. Yes, sir; four hundred feet high—three hundred and fifty feet above the river.

Q. Therefore is not the trolley system a desirable thing to have to ride out to the suburbs on account of these high hills?

A. Not on account of that, but on account of the distance.

Q. Do not these high hills render it necessary for the population, as it is increasing, to flow over into the suburbs?

A. Only to the extent that it affords them a rapid means of transit to and from their home.

Q. Are you acquainted with the country around Philadelphia?

A. I have a general knowledge.

Q. Do you mean to say that the system will be as essential to Philadelphia as it is to Pittsburgh, taking the topographical conditions into consideration?

A. I think it will be one of the best adjuncts to the health of your city as it is to Pittsburgh.

Q. You do not think that the topographical conditions of Pittsburgh makes it any more necessary there than here?

A. I do not.

Q. Do you know anything about the Buda-Pesth system?

A. I have seen the drawings, and I have looked at them.

Q. Do you know anything about the men who built it?

A. Yes, sir.

Q. Who are they?

A. Mr. Siemens is probably one of the most eminent scientific men in the world.

Q. Has not he been more forward than anybody else in the matter of the propulsion of cars by electricity?

A. They have paid more attention to this Siemens' lamp and glass and iron, &c., and electricity is one of the things they have taken up during the past few years.

Q. Don't you know they are the men who have been foremost in introducing propulsion by the trolley system?

A. Yes, sir. I saw the first car they put into the Paris Exposition. They put a line in a place near Edinborough. They had the trolley line running about a foot above ground. That was one of the first commercial lines they put in.

Q. Do you think that the system of overhead wires for a city like Philadelphia, with our narrow streets, is desirable?

A. I do think so.

Q. You think it is desirable to have overhead wires?

A. I come here frequently, and I walk faster than I can ride.

Q. I am asking you, not with reference to the trolley system, but I am asking you about overhead wires of any kind?

A. If you could get a system of rapid transit equally as

good then I should say the trolley would not be desirable, but if that gives you any better transit than you have got, or than anything else at a lower cost, I should say it would be desirable.

Q. Please answer the question. The question I put is whether you think it desirable to have overhead telephone, telegraph, and trolley wires in a city like ours?

A. I should say it is not desirable to have them overhead —telegraph, telephone, or other electric wires. We cannot put those under ground successfully in a great many cities.

Q. Knowing the fact that we have in very many of our streets many electric wires, do you think it is wise or advantageous to add some more?

A. I think, for the results to be obtained, it is wise.

Adjourned to meet on Wednesday, March 16th, at 12 o'clock noon.

STATEMENT OF PROFESSOR DUNCAN.

WEDNESDAY, March 16th, 1892.

By MR. SHAPLEY:

Q. What is your position and in what university?

A. I am at the head of the electrical department at the Johns Hopkins University, Baltimore.

Q. How long have you been at the head of that department?

A. Six years.

Q. How long have you devoted your attention and time to the study of electrical matters?

A. Ten years.

Q. Are you familiar with the different systems of propelling street cars by electricity?

A. I am.

Q. What examination, outside of the examination of the literature on the subject, have you made of the different lines and systems in different cities?

A. I have made reports of the different systems for companies, and I have designed more or less machinery used in

electrical operations. I have also experimented on storage batteries, and have built a storage-battery car which I have run.

Q. Then you have also been employed by companies as an expert to make reports upon different matters of electrical machinery, and therefore know what you are talking about?

A. Yes, sir; I think so.

Q. Where have you seen the trolley system, for instance, in general operation?

A. I have seen it in Boston, Cleveland, Pittsburgh, and a number of cities.

Q. State in your own way whether the storage battery or the conduit system, which have been spoken of, are or are not practical—whether the trolley system is more practical and practicable—their advantages and the disadvantages which you have heard urged here and which you have read in the newspapers.

A. The three systems that could be possibly used for electrical traction to-day are the overhead trolley system, the conduit system, and the storage-battery system. Of those, the trolley system is the only one in practical use. I except a road outside of those which is hardly, I should say, an assured commercial success as yet. That road is in the hands of a company from which no data as to expense can be obtained. As to storage batteries, I have made considerable inquiry. The roads were started first in Brussels by the Julian Company. A road in England was started, and after prolonged experiment it was abandoned. Every care was taken in the Brussels road, which was not a very difficult one to operate as we look at roads here, and every attention was given to make it a success. It failed.

In this country we have an equal record of failure. In New York, on Fourth Avenue, the batteries are very much similar to the other companies, and that road failed, the cars being taken off. At Dubuque, Iowa, they have failed also.

About three years ago I was called on in Baltimore to build a car for some people who owned rights for storage batteries, and the rights they owned were under the

Accumulator Company. The batteries were made according to the Accumulator Company's patents. I think those batteries were as good as any that had been made at the time, or possibly since, because I have used some of them for stationary work since then, and they have been very successful. We built the batteries and the car was equipped by the Sprague Company of New York. It was run perhaps altogether two weeks, or the steady running of it amounted to about that. At the end of that time the positive plates began to give way, and the car was taken off and has not been used since. The reason that that car went to pieces quicker than most was on account of the very heavy grades in Baltimore. The great difficulty with storage batteries is not that they have not enough storage power. You can get enough energy in them to run a car for a considerable distance, but you can only take the energy out of the battery at a certain rate. Now take the circular of the Accumulator Company. They refer to a cell that weighs forty pounds, and it would require one hundred of those cells to run a car, making a weight of four thousand pounds. They give the rate as a maximum of thirty amperes. To pull a car up a five per cent. grade at the rate of six miles an hour it would take eighty amperes, and in a grade heavier than that, of course very much more. That is, you have got to work away outside of what the company gives as a maximum rate. The difficulty is also that the batteries deteriorate—the positive plates—on account of the heavy discharge rate, and in the last four or five years the batteries have not been greatly improved in that respect. Their life is not longer than it was some years ago. I have had batteries lately made by a company that made very good ones a few years ago, that are not good at all. Batteries have been introduced into use in electric lights, but the great improvement has been not in the cells, but in the appreciation of the fact that the cell is not a thing to be used as we want to. We have got to have an immense weight of metal instead of a very light weight.

Personally, I do not think that an ordinary road can be

run by storage batteries and made to pay. In Washington there is a road called the Metropolitan Road, which is going to have forty cars, I think. In that city it is impossible to use overhead wires. They are not allowed. That road cannot be run by cable on account of the curves, of which there are an immense number, and cable engineers say that it cannot be run by cable. By act of Congress, horses will not be allowed there after a certain time, so they are driven to storage batteries, but they have not yet selected a battery.

By MR. BULLITT:

Q. Is that the road that runs along Pennsylvania Avenue?

A. No, sir; it ran on F Street up to about a month ago. Their motors are being built and a power-house put up, but they have not yet selected a battery to run their road. The records had not been good enough for them to choose any particular battery.

By MR. SHAPLEY:

Q. Do you know of any road in the United States or in Europe that is using the storage battery?

A. There is a road in Washington with about six cars, I think, using it.

Q. I mean outside of that.

A. There is a road in Manchester, England, where the storage battery is used. The reports from that road in the technical journals are not favorable, but as to the matter of the expense account in that case, I don't know anything about it. I only know what I have seen in the papers.

Q. Is there any other in the United States than the one that you have spoken of in Washington?

A. No regular running road. The conduit system, of course, has an advantage, if it can be applied, but it has been tried in the United States in two or three places—tried in Cleveland, and it was tried in Boston; a number of experiments have also been made in other places. That has always failed on account of the difficulty of insulating the wires and getting the current from the wires to the car.

One road that is in successful operation is a road at Buda-Pesth. That road at first was not operated in the winter

months, though whether it is now I don't know. The first winter it was not operated by electricity in the winter months, but by horses. That road has a slot of thirty-three millimetres—about one and three-tenths inch wire. There is more or less trouble about getting the current from the wire through the slot. That road is possibly more or less a success under the conditions in which it is run—that is, in the summer months; but with this wide slot, it would not be permitted here.

As far as work in this country goes, although it might be possible to put down a conduit and give very good results, yet it has never been done, and if tried it would be an experiment. There is nothing that we can go to that I think would lead any one trying to put a road in to use the conduit system, because even the experiments tried here have been unsuccessful in this country.

Q. Do you happen to know whether carriages and wagons use the car track in Buda-Pesth, as they do in our cities?

A. I have never been there and I do not know. I think it is very probable that they do not. The trolley line, of course, has the objection that it puts the wire above the ground, as far as that is an objection. They can be made not very objectionable, if the line is properly constructed as far as looks go. They can be made almost absolutely safe by the use of guard wires, and really the great danger, as far as reports of fires are concerned, is not from the trolley line itself, but from dead wires on telegraph and telephone lines. Unquestionably, if they cross a live trolley line, there might be trouble, but by the use of guard wires, that can be obviated.

As far as the danger of trolley lines goes, five hundred volts is not a deadly current. People suffering from heart disease might be killed by reason of a shock of that kind; I had myself such a shock several times, and while it is annoying, yet the only result I have suffered might be a little burn perhaps on my finger.

The record of the trolley lines in the last three or four years has been one of rather steady progress. The first structures put up were rather unsightly, but now

a great deal of experience has been brought to bear, and the overhead wire is not as objectionable as it used to be even in the way of looks. As I say, I do not think it is at all dangerous to life, and I think there are a great many reports which attribute deaths untruthfully to the trolley-wire system. I know of one instance where there was no trolley line in a town, yet an accident which occurred there was laid to the trolley.

Q. The people who report them do not know the difference between the trolley wire and an electric-light wire?

A. No; so that so far as the trolley is concerned, I think it is a practical arrangement, and not dangerous, so far as the current goes. So far as the car goes, the car is under better control than in most of the other systems—under almost absolutely close control—and there should be no more accidents than in any other system running at such a rate of speed. In fact, the car is under such control that it ought to stop quicker, because you can reverse the current in a case of emergency. It would not necessarily be done unless in such a case.

Q. Taking a car running six miles an hour, if the brake is put on immediately to reverse it, in what distance ought it to be stopped?

A. In its own length, very easily, by the hand-brake.

Q. How about ten miles an hour?

A. If the current was reversed it would stop in the distance that you could skid the wheel. It is under the same control that half a dozen other cars would be. There is nothing peculiar in the system so far as that goes. This system has been proved to be an economical success. It is economical. There is no question about that. And it also gives rapid transit when you cannot get it by other systems.

Q. Taking your knowledge of it in the many towns and cities in this country in which it is used, what are the results based on actual experience as to its being a success or not a success?

A. As far as I can find out, when it is once put up in a town there are very few people who want to get it out. Of course, there are some people who always object to everything. As a general thing, however, I think it is satisfactory where it is put in. That has been my towns where it has been introduced.

Cross-examination.

By MR. BULLITT:

Q. Have you had very much experience in the practical operation of it in the various places to which you have referred?

A. I don't understand you exactly.

Q. I understood you to say that, so far as your experience had gone in the places in which it had been used, it was satisfactory. Now I ask you whether your experience in that respect has been an intimate one?

A. I have gone to the different cities and I know of the reports of the railroad superintendents.

Q. What class of cities are you familiar with?

A. Principally in Boston.

Q. Is it not due largely to the fact that electric cars there are very useful for running in the suburbs of Boston which gives them so much favor?

A. I really cannot say what individual opinion is. They simply tell me that they like or do not like it.

Q. Is it not a fact, however, that they are largely used for running into the suburbs there?

A. They are; yes, sir.

Q. Isn't the topographical situation of Boston such as to make some such mode of rapid transit almost a necessity?

A. Well, we have about the same topographical situation in Baltimore.

Q. I mean to say, is it not much more advantageous to have rapid transit in a city situated as Boston is, surrounded so largely by water, and with high hills around it in every direction—isn't that more favorable for the use of a trolley system than a flat, level city would be? In other words, does it not overcome the natural difficulties of the travel from the suburbs into the city more rapidly than would be necessary in a city like this?

A. I think rapid transit is extremely important to every city, outside of its topography. You want to get in town as quickly as you can, and I should imagine that the advantages were of the same importance in a flat country as in a hilly country.

Q. However, that it gives to the city of Boston such great advantages, is the fact that so much of her population pours into Boston daily and goes out daily to and from her suburbs?

A. Well, I cannot say whether that is so or not.

Q. Are you not familiar with the fact that Brookline, Cambridge, and Jamaica Plains, and all these different places—Roxbury—are all very important suburbs of Boston, from which their inhabitants go in and out in the morning and evening?

A. Yes, sir.

Q. Is it not also true that the trolley cars which have been introduced so generally over the country are, in the main, used in streets that are wide, or in suburbs that are comparatively sparsely populated? Are there many cities, or if any, which ones where the trolley system has been introduced into streets which are not more than twenty-five or twenty-seven feet from curb to curb?

A. I am not prepared to make any very definite answer to that question. I think in Pittsburgh and Boston they have narrow streets.

Q. How about beyond Pittsburgh and Boston?

A. think some of the streets of Cincinnati are very narrow. I hardly remember, though, as it has been some time since I was there. In Richmond there are several narrow streets and they have a line there.

Q. Has not that Richmond line been rather a failure?

A. That was an experiment. Of course, at first they had the disadvantage of all experiments. The final success of that road gave an impulse to electric traction that it has today, and has carried it where it is.

Q. That is, it established the fact that the trolley overhead wire system could be used in going up heavy grades?

A. It established the fact that the overhead system was a success, I think.

Q. Has not that road been very much objected to on account of the noise which it made?

A. I do not know about the noise. A good many difficulties occurred, as I say, because it was an experiment. Almost all the experiments were tried down there.

Q. Did you ever happen to sleep in the Ballard Hotel, on the side next to the street where the trolley runs?

A. I slept in some of the cars there.

Q. Did you ever sleep there in the summer when the windows were up?

A. No; I was there in the winter.

Q. Then you don't know of the pleasure of hearing the trolley pass at night?

A. It is never unpleasant to me.

Q. Very great efforts are being made now by practical mechanical men and scientific men to develop this system of propulsion by electricity, are there not?

A. Yes, sir.

Q. Is there any subject to which now public attention is more attracted, or upon which there is really more effort being made?

A. I think not.

Q. With your scientific knowledge and experience, have you any question that there are going to be very great improvements made in the system of propulsion by electricity on street railways?

A. I unquestionably think there will be. In the last few years there have been improvements. For instance, from the double reduction to the single reduction, and the motor which makes no noise at all.

Q. Do you think that is likely to take place rapidly in the future?

A. It is now, and I have no doubt that it will take place rapidly in the future.

Q. In two years from now some system may be introduced which may entirely supersede the present, may it not?

A. Very possibly. At the same time it is hardly probable, I should say, considering the range of development in the last few years. The system to-day is almost exactly like the system proposed in 1886 by Mr. Sprague. It has almost all the essential features, but differs greatly from it in detail. The details have been improved very much. The fundamental basis is, however, the same as was proposed in 1886, and used in 1886, so that while there will be, or there may be, very vast improvements in detail, the thing will come gradually, and the particular system, I think, will remain as it is for some time. The principle will remain as it is for some time.

Q. Taking the case of the trolley system running along a street, it comes to a crossing with another street where there is an aggregation of wires anywhere from fifty to one hundred. Is it not important that there should be a careful arrangement made to guard against the trolley wires and other series coming in contact?

A. Do you mean the other electric light wires and telephone and telegraph wires?

Q. Yes.

A. Do you mean where two sets of wires cross one another? Of course, that is important.

Q. I have had some computations made of the wires which are found upon some of our crossings. For instance, the wires running along Twentieth Street are given me as being twenty-eight; the wires running down Fifteenth Street, telegraph wires, one hundred and six; the wires running down Thirteenth Street, telegraph wires, thirty-four. Those at the crossings of some of these streets is something remarkable. The wires crossing Twenty-second from Market to Walnut, four hundred and sixty. I imagine that that means some three crossings. It could hardly be one crossing. That would probably give one hundred and thirty wires at a crossing. Now, under those circumstances, is it not very important that there should be careful arrangements made to guard the wires, to protect the trolley from coming in contact with the others?

A. Of course, it would be best to do that as far as possible,

but those telephone and telegraph wires go somewhere. Now, the houses into which they go could be absolutely protected by cut-outs—not a very expensive apparatus—so that if you had no guard wires at all and wanted to drop them altogether, you could still have protection where they go into a house; you could use the cut-out and the house would be protected against fire.

Q. But you have them running into thousands and thousands of houses, have you not?

A. Yes, sir, and you could put a cut-out in each house. It is a very small matter and not expensive, and they work very nicely.

Q. Do you mean into each house? For instance, take the Drexel Building, where there are probably running into it four, five, or six hundred wires.

A. Possibly it would cost twenty dollars or thirty dollars to put cut-outs in there for the whole lot.

Q. For each one?

A. No, sir; for the whole lot. That would protect against fire.

Q. Is that system practiced anywhere

A. Yes, I think it is used in Boston.

A MEMBER:—It is used here also.

By ANOTHER MEMBER:

Q. Is not the reason of that large number running into the Drexel Building the fact that they are mainly the wires of the Bell Telephone Company.

MR. BULLITT:—That may be. I only called attention to it to illustrate what has been spoken of. (To the witness.) You do not think then that it is at all important, as I understand you, to use guard wires in protecting these trolley wires?

A. It depends a great deal. I would put guard wires in some places, and in some I would not. It would depend entirely on what the danger of the crossing was. Of course you do not want the other wires to fall on the trolley wire, if you can help it; so that in some places where there was danger I would put a guard wire, but everywhere there ought to be these cut-outs in houses. They ought always to be provided.

In some towns they are required; whether in Philadelphia or not, I do not know.

Q. By whom are they usually made—by the trolley company or by the owners of the house into which they run or by what company?

A. By the company that runs the wire into the house.

Q. Is there any more liability to accident from coming in contact with a trolley, due to the fact that they cannot be insulated, but must be naked?

A. Unquestionably. The middle trolley wire is necessarily a bare wire. The feeding wires carrying the current to the trolley wire are insulated wires; sometimes they are under ground.

Q. Is there any other class of wires that cannot be insulated except the trolley? Telegraph wires are insulated, are they not?

A. They are all uninsulated. Telephone wires are uninsulated; that is, overhead wires. For underground construction, of course, they use a metal, but for overhead construction, telegraph and telephone wires are uninsulated.

Q. How about electric light wires?

A. They are usually insulated. In fact, always.

Q. Therefore, have we not a liability to danger from accident due to the fact of these wires coming in contact and being broken, very largely increased by reason of having all these uncovered wires?

A. You are very liable to have contact between wires. Whether it will be a serious danger or not depends upon how the system is constructed. My own solution of the matter is to put the other wires underground. They can be, and the trolley wire cannot.

Q. I understand you, then, that you would say that you think all the other wires can be put underground, and that that would be the best system with reference to them?

A. I would modify that for suburban districts or where there is very little traffic, where it would not pay to put wires underground, but for what you might call city work, I think the other wires can be and ought to be put underground.

Q. Why do you think they ought to be put underground?

A. The electric light wires used for arc lighting have a voltage of all the way up to three thousand volts. That is deadly. Any one touching them, if there is a break in the circuit anywhere else, is liable to be killed. In storms, where there is possibility of poles coming down, there is always a possibility of touching these wires with a deadly current on them.

Q. Can an arc light wire be put underground except where it is necessary to bring it up in order to make the light?

A. Yes, sir.

Q. Therefore you would say that good construction in reference to these matters would be established by putting the telephone and telegraph and electric light wires underground?

A. Within certain districts. Of course, you would have to use a certain amount of discretion about that.

Q. For the city of Philadelphia or the city of Baltimore, and I mean by that the well built-up and comparatively central portions?

A. Yes; I would put them underground.

Q. Do you not think that it would be wisest, on the part of the government of these large cities, to require that all of these wires should be put underground?

A. I do not. It is a matter in which a great deal of discretion should be exercised. There are some cases where they ought to be put underground, and others, within the city limits, where they ought not. Some one, certainly, ought to be appointed who could tell when they ought and when they ought not to be put underground, and that person or committee should decide.

Q. Of course, I assume that the city authorities would exercise an intelligent discretion as to the distance where they ought to be put underground, and what ought not to be put underground. I assume all that, but I mean assuming that that is done intelligently and discreetly, do you not think that all wires should be put underground except those which cannot be? From your personal experience, do you

not think all such wires ought to be put underground within the districts where the population is such as I have stated?

A. I should think it would be best to put them underground.

Q. Do you not think it would be wisest on the part of the city authorities to have it done?

A. That brings up many questions of the expense and one thing or another. It would be a very good thing if it could be done. There is no question about that.

Q. Do you know the fact or not that it has been done in Chicago?

A. They have underground lines in Chicago and Washington—underground arc lighting lines also in New York?

Q. Have they any overhead lines in Chicago?

A. I do not know. When I was there last they had.

Q. Have they not recently required all the lines to be put underground?

A. I think many cities have required all the lines to be put underground. I do not know whether they have accomplished it or not in Chicago.

Q. How is it in New York?

A. There are a great many overhead lines there, and some wires in conduits.

Q. The mayor there cut the poles down, did he not?

A. Yes, sir.

STATEMENT OF MR. OSTRAM.

By MR. SHAPLEY:

Q. What is your business?

A. I am the Philadelphia agent for the Johnstown Company, of Johnstown, who manufacture rails for street railways, and construct street railways, as far as the track is concerned.

Q. Does your business make you familiar with the different streets in a number of the cities of this country, on which the trolley system exists?

A. Yes, sir; more or less.

Q. Are you familiar with the streets of Boston?

A. I am not. I have not visited Boston since I have been in my present business.

Q. What city are you familiar with outside of Philadelphia? Are you familiar with Baltimore?

A. I am familiar with most of the cities on the Atlantic coast from Scranton to Key West.

Q. State the streets that you know of in other cities, of about the same width as the average street in Philadelphia, on which the trolley system is in actual use.

A. In Paterson, N. J., Mulberry Street is twenty-three feet seven inches wide. In Toledo, Ohio, Huron Street is twenty-six feet wide, and Oak Street is twenty-one feet eight inches from curb to curb, as reported by our chief engineer. In a letter received by him this morning there are measurements taken by him made necessary to secure a special work, and the curves and crosses are given. In Wilmington, Del., Front Street is twenty-five feet wide, and there have been two tracks on a street of that width.

Q. Two trolley wires?

A. Yes, sir. Ninth Street, Wilmington, is twenty-five feet; Eleventh Street, Wilmington, twenty-five feet; Albany, N. Y., Steuben Street, twenty-six feet; Beaver Falls, Pa., Tenth Street, twenty-six feet: Covington, Ky., Third Street, twenty-six feet; Indianapolis, Ind., Brown Street, twenty-five feet; Atlanta, Ga., Richardson Street, twenty-six feet; Chester, Pa., Second Street, twenty-four feet.

The above list comprises a few of the streets that the writer has personally measured, but does not represent anything like as complete a list as could be made, if time were given to a more thorough and extended canvass.

Q. What is the width of Chestnut Street, Philadelphia, from curb to curb?

A. I measured in front of this building this morning, and it is twenty-six feet and two inches. I presume it is intended for twenty-six feet. In measuring we frequently find, in one case, a curb will be from two to three inches in, and in another place it will be narrowed.

STATEMENT OF MR. STERN.

By MR. SHAPLEY:

Q. What is your business?

A. I am the representative of the Edison General Electric Company. I have here cut-outs for the purpose of protecting buildings against the injurious effects of fires.

Q. That is, buildings into which electric light wires run?

A. Yes, sir; I have in my hand an article which is required by the rules and regulations of all the boards of fire underwriters in the country.

Q. Required in what cases?

A. In all cases where electric light wires are brought from the street into the building.

Q. Is there any necessity for using them for telephone and telegraph wires, or are they used that way?

A. They are slightly modified for that purpose.

Q. That is, for electric light wires?

A. Yes, sir; entering a building.

Q. They are required by the board of underwriters of all cities where electric wires are used?

A. Yes; and insurance is not granted on any building or supposed not to be, unless after inspection is made by the inspector of the board of fire underwriters. Among other things, it looks for this thing right at the entrance of the building.

Q. What is the effect of that thing?. Is it possible for a fire to occur?

A. Absolutely impossible for this reason: The current in passing through passes through a small piece of fuse wire that melts at a very low temperature. It is just capable of carrying the amount of current necessary to do the work for that part. In case of a heavier current coming through, either because of a cross with some other electric light wire, or a trolley line, or anything else that might interfere, this being the weakest link of the chain, is the first thing to go, and it opens the circuit.

Q. So that, if an accident should happen by reason of a storm to an electric light wire, which should fall on a trolley

wire, that would make it impossible for fire to occur in that building in which it was used?

A. Yes, sir; under any circumstances whatever.

Q. What is the cost of it?

A. Thirty cents.

Q. And a man cannot have an insurance on his property who has an electric light wire running into his building without the use of that contrivance?

A. Certainly not. All contractors make a clause or a section in their contract to that effect.

Q. So that, in actual practice, there is practically no trouble or danger from accidents, such as have been spoken of, by reason of an electric light wire falling on a trolley wire in any house in which an electric light wire runs?

A. It is absolutely impossible, if it is done according to the rules and regulations of the board of fire underwriters.

Q. Is there any trouble about putting that on telephone and telegraph wires?

A. No; they have a slightly modified form. This is one of many types used for that purpose. The wire coming from the outside of the building passes in through a small helix, down through that rod to the telephone, and with a normal current it remains. In the presence of an abnormal large current, that is energized and acts as I now show.

Q. What does that cost?

A. I think that that sells for about seventy-five cents; I am not positive as to the exact price; there are a great many of these in use.

Q. So that, whatever danger there may be from a telegraph or telephone wire falling on a trolley wire, it can be obviated by the use of that?

A. Yes, sir.

Q. The cost is not over seventy-five cents to make it impossible for an accident to happen to any house by reason of contact between the telephone or telegraph or burglar-alarm wires, and the trolley wire?

A. That is so, and I will be pleased to take a contract to cover the entire city at twenty cents a wire if you use this article that I have here.

Cross-examination.

By MR. BULLITT:

Q. Do you know anything about the destruction of the switch-board of the telephone system in Albany in March, 1891, caused by a fire, caused or supposed to have been caused, by electricity?

A. I am not familiar with that particular switch-board.

Q. Are you familiar with the reports that were made of the fire that occurred there?

A. No, sir.

Q. You don't know anything about that?

A. No, sir; except that I know that there was such a fire, but I never went to the trouble to inquire, because I have always considered that fire to a switch-board was the result of negligence entirely. This is a thing that has been known in the arts for years.

Q. Then you think that, if there was a fire, it would be simply negligence?

A. Yes, sir; entirely so.

Q. You know that there are a great many reports published from time to time of similar accidents to that which occurred in Albany?

A. Yes, sir.

Q. Have you taken the trouble to see whether they were caused by similar negligence or not?

A. I have; yes, sir.

Q. That is usually the case, is it?

A. Yes, sir; I think you will find preventatives used in every one of those cities where they have had trouble. After the horse was stolen they generally locked the stable-door.

Q. You do not think, then, that there is any necessity for any guard wires, or any act of prevention, except this little machine which you have described?

A. I should use guard wires if I was operating a railway system for my own protection, because every link that would come across there would mean so much coal out of my coal pile.

Q. How many guard wires would you use along one of our streets for the protection of a trolley wire?

A. That would depend entirely on how many wires happened to be likely to fall in case of a sleet storm. That is all.

Q. You are familiar with the city, are you not?

A. Yes, sir; fairly so.

Q. Where there are forty or fifty wires running along a street, and at the crossings, perhaps, double or treble that number, what would you say would be a proper system to protect?

A. Do you mean fifty wires running parallel?

Q. I mean simply running parallel or transversely.

A. Under conditions of that kind I would be apt not to put any on.

Q. Why not?

A. Because I would not want to put up a structure that would hold all those fifty wires in case they dropped.

Q. You would not think that having all those wires there would render an accident more liable to occur than if there was only one?

A. Well, I wouldn't say necessarily; no, sir.

Q. Do you think there would be some reason if there were only a few?

A. Yes, sir; I should think so, and they were put up upon weak and small supports.

Q. I have understood you to say that where there were so many of those other wires, as I have described, you would not undertake to do it, because it would be necessary to put up a heavy structure to protect against such a large volume of wires. Can you not come down to any number that you consider smaller, against which you think it would be necessary to put this thing up?

A. I wouldn't base that upon number at all; for instance, here wires are scattered here, there, and everywhere; on the house-tops, which are objectionable to firemen and everybody else. Things that are weak and liable to fall, and for my own protection I should put up guard wires, but in no case would I allow them to exceed three in number on a double trolley line.

Q. Running parallel with it or at right angles with it?

A. Parallel with the line itself.

Q. Would you not then have to have wires running at right angles in order to support those?

A. No necessarily.

Q. How would you support them?

A. With insulators upon the original span wire, if necessary.

Q. Taking our streets, where I suppose it is not probable that they will undertake to run the poles from the centre of the streets but from the sides of them, how then would you support the trolley wire and also those guard wires of which you have spoken?

A. Your span wire moves from pole to pole, aad is carried from pole to pole either side of the street. From that you hang an insulator which is a distance, say, seven inches below the line of the span wire itself. There is nothing in the world to hinder me from putting two insulators upon my span, where it would be seven inches above the trolley wire, and upon that carrying a guard wire.

Q. How many wires would that make in any street according to your system—I mean at any given point?

A. What do you mean by my system?

Q. I mean what you have suggested.

A. In addition to the trolley wire, it means three guard wires on a two trolley line on a double-track road, and the span wire. The feed wires depend entirely upon circumstances. It might be carried on a pole or underneath the ground.

Q. How many feed wires would there be—one?

A. That would depend entirely on the number of cars run, the speed, the grades on which they were to run, and the length.

By MR. SHAPLEY:

Q. Do you know of any insurance company in the United States, or any town or city in which there is a trolley system, that has ever increased the rate of insurance on any property to the extent of one penny, by reason of the erection and the operation of the trolley system?

A. Absolutely none.

STATEMENT OF MR. FIELD.

By MR. SHAPLEY:

Q. What is your business?

A. Electrical engineer and contractor.

Q. How long have you been in that business?

A. About eight years.

Q. You are the president of what association?

A. Of the Field Engineering Company.

Q. What electrical roads have you been engineer for?

A. Buffalo, Newark, Paterson, Trenton, and a number of others around the country.

Q. So that you are thoroughly familiar with the trolley system, are you?

A. Yes, sir.

Q. What do you know about the Buda-Pesth conduit system that has been spoken of?

A. We had heard a good deal about it, and last winter we went to the expense of sending one of our engineers over there to make an examination of it and report to our company for the purposes of our business. We found, as the result of that, that the road had been put in as an experiment, and had been carried on as an experiment—had been carried on a year by them as an experiment there—and that there had been a continuous series of changes from the beginning to try and remedy defects and troubles that they had had with it. The result of our report was that we could not recommend it to anybody to experiment for the present, in this country.

Q. If it was a practical success—if it could be used—I should think you would be too glad to have it, and would recommend it?

A. Yes, we would put it in quickly, for it would help us with our work.

Q. What were the defects found in it there? Could it be run in the winter time?

A. They had had trouble with it in the winter right along. The climate there is much milder than here and different in many other respects. The local conditions there are differ-

ent from almost any city in this country and everything tends to help it to its advantage there, as to locality, &c.

Q. Do you know the length of it?

A. It has been extended so that it is now, I believe, over ten miles long.

Q. Do you know whether carriages and wagons use the track upon which the cars run?

A. It was impossible for them to use the tracks. The rail is such a one that no city would let us put it down in this country. A wagon cannot track on it.

Q. What kind of a street or streets is it used on there?

A. Their paved streets partially.

Q. Narrow or wide streets?

A. Their wide streets as a rule, so that a wagon can keep away from the track.

Q. Please describe what is the peculiarity of the rail used there.

A. The rail is a kind of double T-rail, like we use on steam railroad work in this country. That is the nearest thing we have to it.

Q. The same as the double T-rail of the steam roads?

A. Yes, sir; with a centre grooved wheel, and the slot is in the rail.

Q. What about the storage battery system? Do you know of any road in the country in which it is used?

A. There has never been a road in which the storage battery has been accepted by it and operated by it. When it has ever been put in, as long as it was running it was kept there until the pocket-book of the company that put it in had become exhausted.

Q. In other words, it has always been put there by the exploiters of the particular battery?

A. Yes, sir.

Q. It has been put there at their expense, as an experiment, to have it tested, in order to try to have companies adopt it?

A. Yes, sir. They are continually breaking down and in trouble, and it wants very favorable conditions for them to operate at all.

Q. Do you know whether the conduit system has been tried and experimented here?

A. Yes, sir; it has been experimented on in four or five different parts of the country—Cleveland, Pittsburgh, and one or two other places.

Q. And always abandoned as an impossibility?

A. Yes, sir. The West End Road in Boston went into it with a desire to have it succeed, and put down five miles, spending several hundred thousand dollars trying to make it a success, and the city at the end of two years gave them overhead franchises to replace it there, and in the other parts of the city, as it delayed people and the public there by breaking down from storms.

Q. You have erected a number of trolley roads?

A. Yes, sir.

Q. Take the streets of Philadelphia. You know about the lengths of the squares. How many poles would there be erected on a block in Philadelphia, and how far apart?

A. One every one hundred and twenty-five or one hundred and forty feet.

Q. It has been said by one gentleman who professed to have some knowledge on this subject, that the poles would have to be seventy-five feet apart only?

A. I have built the heaviest kinds of lines in the largest towns, and I never used a pole, unless it was on a curve, less than one hundred and twenty-five feet. It comes down to a question of good construction—poor work for little towns costing $1000 and $2000 a mile, and good work for larger towns costing $8000 or $10,000.

Q. Which is the cheapest—to put poles seventy-five or one hundred and twenty-five feet apart?

A. To put them seventy-five feet apart.

Q. It is cheaper to put them that close together than one hundred and twenty-five feet apart?

A. Yes, sir; you can put up a lighter line.

Q. In your experience, and from your knowledge on the subject, what is the extent of danger to life, of which so much has been said, and about which so much talk has occurred?

A. No passenger on any electric car has ever had a shock from riding on them that there is any record of, that I know of. The employés in the station handling the motors, &c., nearly every one has had a shock, and they are all alive to-day and in good health.

Q. Is there any way in which a person, not a workman connected with the line, could by any possibility come in contact with that wire eighty feet above the ground except by climbing up and taking hold of it?

A. No, sir.

Q. Or in the very rare case in which a wire might break and strike him?

A. If the wire broke and came down it would be immediately cut off at the station. It would be a dead wire. In any well-built system the wires are so arranged and cut up into sections that if by any accident any wire should be broken down, it would be immediately cut out at the station, or would be a dead wire, and could give no trouble at all.

Q. Cut out automatically?

A. Automatically, or by hand-switch, either one. It can be made automatically, if desired.

Q. Suppose a wire touched the ground before any man or horse came in contact with it, what would be the result?

A. If it touched the earth or wet ground, it would burn off and hang loose above the ground.

Q. Would the current pass into the ground?

A. Yes, sir; for the moment, until the wire was burned off, and then it would be disconnected.

Q. So that, even in case a trolley wire should break down, it could not, by any possibility, as I understand you, even shock a person unless he came in contact with it before it had touched the ground?

A. Yes, sir; that is just it.

Q. That is to say, that unless that wire touched some man or some horse passing on the street before it touched the ground, he could not by any possibility even receive a shock, for the reason that the moment it falls to the ground the current passes off?

A. Yes, sir.

Q. Have you ever known or heard of a well-authenticated case that can be relied on, in which such an accident happened as a person getting shocked or hurt on the street by reason of any line coming in contact with a trolley wire before the current had been discharged into the ground?

A. No, sir. We see cases mentioned in the newspapers once in a while, but when they are examined they are cleared up and found to be a mistake of the reporter wanting to be in too much of a hurry to get some news.

Q. Where such accidents have happened they have been very largely with electrict light wires?

A. Very largely caused by other wires falling over them.

Q. And blamed on the trolley?

A. Yes, sir.

Q. Have you ever known of the case of a fire happening to a building along a street in which the trolley wire system is used, which was caused directly or indirectly by the trolley system?

A. No, sir.

Q. Suppose a trolley wire should break and drop on the stones instead of on the rail, what would be the effect as to the current?

A. Do you mean in wet or dry weather?

Q. I mean in either.

A. There might be a few little sparks, of course, but there would be no damage or anything done.

Q. What I mean, would the current pass down through the stones into the earth or would it be a live wire?

A. On a dry day it would not have much passage of current at all.

Q. But it would be cut off at the station?

A. Yes, sir.

Q. Within how many seconds or minutes?

A. Within two or three seconds.

Q. It would be cut off even if the current did not pass down into the earth by reason of its being a dry day?

A. Yes, sir.

Q. If it was a wet day and there was moisture on the stones, what then?

A. It would be just the same as though it hit the rail.

Q. It would pass down instantly?

A. Yes, sir.

Q. So that there is no possibility of a man being hurt by the breaking of a wire, except in the extremely improbable case of the wire striking him at some place in the body before it would touch the ground?

A. Yes, sir.

By A MEMBER:

Q. How long has that cut-off been in operation?

A. There are a number of places where they have been using it for the last year.

By ANOTHER MEMBER:

Q. What would be the effect if a wire dropped between two poles and did not strike the ground, coming within six or eight inches of it?

A. Nothing would happen.

Q. It would be a live wire?

A. Yes, sir. Nothing would happen at all.

Q. How about if anybody came along there?

A. If it was a wet day, and you took hold of it, you might get a little shock.

Cross-examination.

By MR. BULLITT:

Q. You consider the trolley a very innocent sort of thing, don't you?

A. Yes, sir.

Q. You also consider that these newspapers that have been publishing all these fearful accounts of accidents have simple been exaggerating or drawing upon their imagination, do you?

A. That thing has been thrashed out in a good many hearings and examinations, and it has been found invariably that those accounts were exaggerated and did not represent the exact facts as they occurred.

Q. How do you account for that? Do you suppose that all the newspaper reporters who get up these accounts are very ignorant of their business?

A. They are usually, as a rule, ignorant of the electric business, and want to get sensational items.

Q. They are ignorant, then, of the subject-matter about which they are writing, are they?

A. Yes, sir.

Q. Do you consider that they are careless?

A. That depends upon circumstances and upon the man.

Q. I mean as to the facts which they are undertaking to give to the public?

A. A good many times; yes, sir.

Q. Then you would say, taking it as a whole, that newspaper accounts as to dangers and accidents in connection with the trolley system, are simply a series of misrepresentations? Do you mean to say that?

A. There have not been a large number of those reports. They have been very few in number. They are repeated over, and one case is made into two or three cases.

Q. Then you think that in this respect newspaper publications are either absolutely false or totally unqualified, do you?

A. In a measure. I say in general the facts in those cases are exaggerated very largely.

Q. You do know the fact that there are constantly publications in the newspapers about these things?

A. Once in a while; yes, sir.

Q. Don't they occur frequently?

A. No, sir.

Q. Do you read the newspapers very often?

A. Every day.

Q. Yet you know say that the publications of these accidents and dangers from the trolley are not numerous in the papers?

A. I claim this: That taking the amount of use of the trolley wire, as compared with other uses and forces that we have in the present day, the accidents from the trolley wire are a great deal smaller in percentage than from any other uses

Q. If it was a wet day and there was moisture on the stones, what then?

A. It would be just the same as though it hit the rail.

Q. It would pass down instantly?

A. Yes, sir.

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By ANOTHER MEMBER:

Q. What would be the effect if a wire dropped between two poles and did not strike the ground, coming within six or eight inches of it?

A. Nothing would happen.

Q. It would be a live wire?

A. Yes, sir. Nothing would happen at all.

Q. How about if anybody came along there?

A. If it was a wet day, and you took hold of it, you might get a little shock.

Cross-examination.

By MR. BULLITT:

Q. You consider the trolley a very innocent sort of thing, don't you?

A. Yes, sir.

Q. You also consider that these newspapers that have been publishing all these fearful accounts of accidents have simple been exaggerating or drawing upon their imagination, do you?

A. That thing has been thrashed out in a good many hearings and examinations, and it has been found invariably that those accounts were exaggerated and did not represent the exact facts as they occurred.

Q. How do you account for that? Do you suppose that all the newspaper reporters who get up these accounts are very ignorant of their business?

A. They are usually, as a rule, ignorant of the electric business, and want to get sensational items.

Q. They are ignorant, then, of the subject-matter about which they are writing, are they?

A. Yes, sir.

Q. Do you consider that they are careless?

A. That depends upon circumstances and upon the man.

Q. I mean as to the facts which they are undertaking to give to the public?

A. A good many times; yes, sir.

Q. Then you would say, taking it as a whole, that newspaper accounts as to dangers and accidents in connection with the trolley system, are simply a series of misrepresentations? Do you mean to say that?

A. There have not been a large number of those reports. They have been very few in number. They are repeated over, and one case is made into two or three cases.

Q. Then you think that in this respect newspaper publications are either absolutely false or totally unqualified, do you?

A. In a measure. I say in general the facts in those cases are exaggerated very largely.

Q. You do know the fact that there are constantly publications in the newspapers about these things?

A. Once in a while; yes, sir.

Q. Don't they occur frequently?

A. No, sir.

Q. Do you read the newspapers very often?

A. Every day.

Q. Yet you know say that the publications of these accidents and dangers from the trolley are not numerous in the papers?

A. I claim this: That taking the amount of use of the trolley wire, as compared with other uses and forces that we have in the present day, the accidents from the trolley wire are a great deal smaller in percentage than from any other uses

and forces that we have, whether this system or anything else, and they pay no attention to the other things and magnify these. I can refer you to accidents without number.

Q. Why do you think the newspaper reports are mainly confined to trolley accidents?

A. It is generally in places where the trolley has not been introduced. Where it has been introduced you will find that the papers invariably are using it.

Q. Have you been reading the Albany papers?

A. I read them very seldom.

Q. Have you read any of the Boston papers?

A. Yes, sir; once in a while.

Q. Don't you find them sometimes attacking the trolley?

A. One or two newspapers do; yes, sir.

Q. Pretty severely?

A. I know that they are trying to hurry them up to get them to introdnce it in other parts of the city.

Q. Don't you know that some of the newspapers there are attacking it?

A. One or two, I believe, do sometimes; yes, sir.

Q. Then you think that the statements which you see now and then in the newspapers attacking the trolley are either due to ignorance, or to misrepresentation, or to carelessness in obtaining information?

A. Yes, sir.

STATEMENT OF MR. HIGGINS.

By MR. SHAPLEY:

Q. What is your business?

A. I am the general manager of the Short Electric Railway Company of Cleveland.

Q. Are you familiar with electric roads in this country?

A. Yes, sir.

Q. How long have you been so?

A. About four years.

Q. You have a road in Cleveland?

A. No, sir; the company with which I am connected is a manufacturing corporation.

Q. You do not erect the trolley system?

A. Yes, sir; we erect it, but we do not run it afterwards.

Q. Are you familiar with it in other cities besides Cleveland—with its operation and its advantages and disadvantages?

A. Yes, sir.

Q. Are you acquainted with the literature on the subject?

A. Yes, sir.

Q. Are you acquainted with the opinions of experts and railroad men generally on the subject?

A. Yes, sir.

Q. Before speaking of the trolley system, you have heard the testimony of other witnesses with regard to storage batteries. Have you ever heard of a company that has run, as a success, the storage battery?

A. Never.

Q. Is there any company in the United States that is doing it outside of the one in Washington, that has been spoken of?

A. I do not know of any.

Q. You would be likely to know of them, if there were any?

A. Yes, sir.

Q. It would be your business to know?

A. Yes, sir.

Q. Taking the conduit system, is there any such system known to you or to your profession that is practicable in this country?

A. No, sir; absolutely none.

Q. Is there any other way that you know of in running a surface road except by the horse, the steam, or the trolley system?

A. There is also the cable system. There is no other system.

Q. State your experience briefly in regard to the advantages and the alleged disadvantages or objections to this system.

A. I think one point has perhaps not been brought out; at least I have not heard it, though I have not been here very much. The great advantage, in my mind, of the trolley

system is found in the complete control of the car. In the trolley system you have one feature which tends much to that control better than any other, inasmuch as you can reverse it instantly in case of threatened danger. By a simple movement of the switch the current can be turned on with a force four or five times as great as is used in propelling it—a force so great that while the car is moving forward the wheels may be spinning backward in the attempt to get a grip on the rail. That means, of course, that besides having the whole brake-part of the car available, you have the electrical part available for running it backward, and in one case where a man had been knocked down by the dash-board of an electric car, before he reached the first motor the car was stopped and reversed. That, however, would not be true if it was going at a rapid rate of speed. It would be anywhere from a car length. A car could usually be stopped in a car length.

Q. In other words, suppose a car was running in a crowded street where it would have to run at the rate of not over six miles an hour, and people were passing, the advantage that it has in that respect over the horse-car would be, as I understand you, this: In the horse-car you have no power to stop it except the power of the brake, whereas in the trolley car you have the power of the brake, and added to that the full power of the motor.

A. The very enormous power of the motor—as I say, three or four times as great as is used in propelling the car forward. There is a familiar electrical reason for that which it is not necessary to explain here.

Q. You have heard the statements of other experts here in regard to accidents. You would be likely to know, I suppose, of well authenticated cases of accident that have happened, would you not?

A. Yes, sir.

Q. State any cases that you have ever heard of in the two hundred and fifty cities with seven thousand cars, either actually built or being put on the four thousand miles of tracks of this system. State any accidents that you have ever heard of to any one outside of the workmen, on this trolley system.

A. The question of danger comes right down to this: When the trolley system was first introduced and started, it was foreseen that the great objection to it in the minds of the public would be the question of a bare overhead wire. It was seen also that that objection must be overcome if the system was to be made a commercial success, by making the pressure so low as not to be dangerous to life. Now, as a matter of fact, there has never been, to my knowledge, and I believe I can say positively, a case of deadly accident from the trolley system. That, of course, is negative testimony. On the other side, as positive testimony, I could go out to-day and get the affidavit of thousands or more people who are employed in making the motors, and right amongst the machinery in the stations, that they have taken a full shock with only momentary inconvenience. I have myself known a number of cases of that sort where the full shock has been taken. As far as the question of horses is concerned, there have been a few records of where horses have been killed by the current.

Q. State the outside number, including every doubtful case.

A. I have never known myself of more than three or four well authenticated cases. I have myself been present at an experiment, which would perhaps be of a little value here, where a worn-out street-car horse was put into a closed stall and a wire wound around his body several times. He was placed upon an iron dash-board, so that all four feet rested upon it, making a first-rate electrical circuit. The ground wire of a dynamo was connected to this, and five hundred and ten volts, or a little over, were administered to the horse. He jumped and started. It was on for about fifteen seconds, I think. After the result of the thing he was led off as good as new. I believe the stableman said the current had a sort of laxative effect on him for a few hours. That was the only result. That was done twice.

There are some horses very sensitive, the same as men are, to a current, and I think it quite possible that some horses would have a nervous system which would make it impossible

to administer that without death. At the same time, it is very rarely in any case of that sort that it comes up in practice.

Q. Did you ever know of a horse taking a step-ladder and climbing up eighteen feet in the air to get hold of a trolley wire?

A. Not outside of a circus.

Q. Then the only way in which a horse could possibly be injured would be where the trolley wire would break?

A. Yes, sir.

Q. The horse, of course, cannot get to the wire, and the wire cannot get to the horse, unless it breaks?

A. That is true.

Q. What is the result, if a wire breaks, with the appliances used for the purpose of cutting off the current instantly?

A. If a wire should fall upon the ground, as has been stated, it would be automatically cut off.

Q. The current would pass into the ground instantly?

A. Yes, sir.

Q. The wire would be a dead wire, that you could put into your mouth with safety?

A. Yes, sir; I would not hesitate, if I put up the appliances and the whole matter, to go up and take hold of a wire in that way, and it would make no difference in use whether the wire should break in the middle between two poles or not, supposing that only a part of it should remain only six or eight inches above the ground. The other half, in the fall, would strike the ground and cut out a whole section of a thousand feet, so that a wire suspended above the track would be dead, the same as the wire which touched the ground.

Q. If I understand you, it is impossible for a horse to be hurt, or a human being to be hurt, or even shocked, except in the extremely improbable case that this wire should just happen to strike some horse or man before it touched the ground at any place?

A. If the circuit is properly put up.

Q. Have you ever known, and I do not speak of your personal knowledge, but of cases which have been brought to

your attention, of an accident from fire to a house on any street on the thousands of miles on which this system is used, due directly or indirectly to the use of the trolley wire?

A. I know of nothing personally in that way. It would not be impossible, however, in some places to have it occur.

Q. Would it be possible with a system properly constructed as they are constructing them now?

A. No, sir; I think it would be impossible. I think it should be made impossible.

Q. It can be made impossible, also, can it not?

A. Yes, sir; entirely, I think. There is no question about that.

Q. Do you know of a single insurance company in the United States that has ever raised the insurance on any house property along the line of trolley wires to the extent of one penny in consequence of trolley wires running in front it?

A. No, sir.

Q. It has been stated here very recently, and as a matter of prophecy, in some of these letters written by certain Pittsburg lawyers, that property will, and has, depreciated along the streets on which the wire runs. What is your knowledge on that subject?

A. I think that, on the contrary, property has increased, not only in the suburban districts, but also in the built-up portions of the city, because the facilities given to people from the suburban parts to the stores has more than counteracted the disadvantage of overhead wires.

Q. It has been said, and said with some force, and I say that because I myself have seen some of these systems in which the noise was undoubtedly annoying, that the general experience is that people are greatly annoyed and incommoded by the noise. State all you know on that subject, good and bad.

A. There has been a great deal of complaint on that score, and as you say, justly. It has been due to the fact that in the motors adopted by the different roads up to about a year ago there have been eight gears to a car. Those eight gears

are done away with entirely now in the later types of motors, and in all of the types that have been adopted one-half of them have been done away with. The noise of the cars which have been going into service within the last six or eight months is something which is not as great as one of the old-fashioned horse-cars with rattling windows. In other words, you have more noise from horses and horse-cars than you do from the later types of motors. There is nothing that can be more quiet than the Newark electric cars.

Q. Will it cost the Traction Company any more to put on the new ones than it would to put on the older system, if this ordinance should be adopted?

A. It probably would, although not very much more. There have been improvements in the process of manufacture which make the cost practically the same.

Q. Then you say that, if the proper appliances are put on and the new and improved motors, the matter of noise will be of no account whatever?

A. Yes, sir; it is less than horses.

Q. Is that the experience of other people?

A. Yes, sir; I could take you to roads where you would find the cars were less noisy than other roads now operating horses. I would like to state another advantage, which is in the reliability of the service. That is, perhaps, a thing which you will be doubtful about, but it is true that electric service, properly put up, is more reliable than cable or horse service. The cable system is liable to a complete stoppage on account of breaking the cable. It runs all the cars. In an electric system, properly put up, it is only possible in the case of an accident happening to any one portion of the line for that to apply to that one section, varying from one thousand to two thousand feet, and on both sides of that section the cut-out current goes on, and the cars go on operating as before. In snow storms electric cars have been found by actual experience to be more reliable and to keep up closer schedule time than either horses or the cable system. That is simply a matter of fact capable of demonstration.

Q. Do you know of other streets in other cities of the

width and general character of the streets of Philadelphia on which this system is used successfully and satisfactorily?

A. The streets of Boston are much worse for the electric system than they are here.

Q. Are you familiar with the streets of Boston?

A. Yes, sir; they are crooked and narrow, as is pretty generally known, I suppose, and there have been complaints from time to time in Boston about the gorging of the streets by the trolley cars. That is simply a legacy of the old system, joined to the fact that the trolley cars carry a far greater number of people than the old horse-cars ever did.

Q. They are larger, are they not?

A. Yes; they have had to make them larger in order to prevent that gorge and to carry the people. There are two lines in Boston, the Washington Street Line and the Tremont Street Line, paralleling each other just a block apart. They put the trolley system upon Tremont Street, the line next to the Common. Before that it was the Washington Street line which was gorged, and that carried nearly all the people. That travel has departed to the Tremont Street line almost completely. Tremont Street is filled up with cars to such an extent that there are very serious delays there, because if you get cars ten feet apart, say along a stretch of two thousand feet, it is impossible to make rapid transit, no matter how fast cars can go.

Q. I refer particularly to the question whether the system is used successfully and satisfactory in streets as narrow as the streets of Philadelphia?

A. Yes, sir; more so.

Q. And as much crowded?

A. Yes, sir; narrower streets—streets more crowded.

Q. It is said, and has been said with a great deal of emphasis, that, by reason of the character of our streets as to width, the territorial character of the city of Philadelphia, the thickly built-up portions of it, the way in which the streets cross at right angles, that the trolley system is impracticable here and objectionable, more so than it would be elsewhere. State whether it is used in sections of other cities

similar substantially to Philadelphia in the built-up portions of the cities, and the crowded portions of the cities, the portions having narrow streets?

A. It is. It is used with entire success. There is no question whatever about that.

Q. Does Boston have overhead electric light, telegraph, and telephone wires?

A. Yes, sir.

Q. Or are they underground?

A. They are overhead, I think, almost entirely. I have not been there myself to know very much about them for the year past.

Cross-examination.

By MR. BULLITT:

Q. You have spoken of the fact that noise has been reduced to a minimum, as I understand you—that it is not nearly as annoying as a horse-car?

A. Yes, sir.

Q. Is there any noise that proceeds from the friction between the trolley and the wire?

A. Yes, sir; there is a slight hissing sound.

Q. Are there any sparks emitted from that?

A. Occasionally; yes, sir.

Q. Do you know whether horses have any particular fear of that particular thing—the noise that comes from the trolley—its motion and the sparks.

A. They do for about a week after it is first introduced. They get accustomed to it very quickly. In Cleveland a horse would never think for a moment of starting at it in any way.

Q. Is it not true that you can frequently educate a horse to almost anything in the shape of noise, when he finds that it does not hurt him?

A. Yes, sir.

Q. How is it as regards the fact of the education—do you think it is a very agreeable thing to be on a vehicle in a narrow street, where you are between a car propelled by electricity on one side and the curbstone on the other side, with a space from one to the other of about ten feet?

A. The most of the fright horses have is not so much at noise, as from the fact that there are no horses propelling the cars. Now, if you change from the horse-car system to the cable system, you would have the same fright with horses as in the change from the horse-car line to the electric line. If horses are accustomed to the cable line here, there will not be the slightest necessity for education.

Q. Suppose I was to tell you of a gentleman who had his horses here and had them perfectly broken to cable-cars, and who used to pass under the cars on Twenty-second Street where the elevated Pennsylvania Railroad comes, who took his horses to Newport, and that they there came in contact with the trolley, became alarmed and frightened, and subsequently could never be induced to approach these places afterwards when they came back to Philadelphia, being so much demoralized that they were even frightened at the cable-cars. Do you think that is improbable?

A. No, sir; that is quite a possible case, but that would be explained by the fact that the hissing sound of the trolley would not be perceptible here in this city in the multitude of other noises which you have. In Newport it is very quiet.

Q. You have spoken of the multitude of noises which would deaden that hissing sound, but take the case of a trolley running along a place not occupied as densely as Chestnut Street, and with vehicles not as thick upon it, where there is not that lot of noise of which you speak, or that tumult of noises, would not the noise which proceeds from that trolley be likely to produce an effect upon a horse when he first came in contact with it?

A. It is possible.

Q. Is it not probable?

A. Well, I do not know.

Q. I mean a horse that had any nervousness?

A. I honestly do not know about that. I do not know the sensation of a horse exactly, and which element of the

two things enters most into his mind when he takes fright at an electric car.

Q. Has it not, however, been your observation that it would be dangerous for a man to find himself between meeting a trolley-car in a street of the width of which I have spoken, where the distance from the track to the curbstone was only ten or eleven feet? Would you not think it was rather a dangerous place with a spirited horse for the first time to encounter such a thing?

A. Well, I wouldn't like to try it. That is one of the cases where I think that a short time devoted to the education of the horse is well paid for by the advantage of having a rapid transit.

Q. In other words, you think that it would be the duty of all persons who had horses, after this system was introduced, to put their horses through a system of education?

A. Yes, sir.

Q. And that if they did not, they probably would run the risk of having their necks broken? That is it, is it not?

A. Yes, sir; I think so.

Q. Is it possible to eliminate from the trolley system, while it has the trolley wheel which revolves upon the trolley wire, that element of danger arising from that cause?

A. That is a question a little difficult to answer. The hissing sound is due to the fact that you have there a wheel revolving at a high rate of speed upon that trolley wire. Now, the company with which I am connected, as a matter of fact, at first started out with sliding-shoe on that trolley instead of a wheel, that shoe having a piece of soft metal inserted which did away with the noise; but there were disadvantages about that which chiefly showed themselves in the wearing away of the trolley wire, and consequently a tendency to break at the weakest point after considerable wear, so that that was abandoned and the wheel substituted. I honestly think that that matter of the hissing noise is one of the extremely minor things—one to which the horses very quickly get accustomed; and I base that upon my knowledge, which is positive knowledge, that with any other city in which the

trolley system is in operation, where I have been, and that is quite a number, I find that the horses pay no more attention to an electric car than they do to another, or to a locomotive.

Q. Are you anything of a horseman yourself?

A. No, sir; not very much.

Q. Then you have not had much experience in driving a horse along by trolley cars when they first started?

A. Yes, sir; I have driven a horse several times.

Q. Did you not observe that the horse, the first time that you passed the trolley-car, looked up to see what that meant?

A. I cannot say that I ever had the job of breaking in an uneducated horse to the trolley system. As far as I can think at the present moment I have never been in towns where the trolley system was just established—that is, at the inception and running of the first few months—so that my testimony on that point would not be of very much value. All I know is that after they are once put in operation for even a short time horses get thoroughly accustomed to them.

By MR. SHAPLEY:

Q. Do you find that people where it has been used, after it has been up and tried, make any serious complaints on that score?

A. No, sir; I suppose in Cleveland we have had one of the most extreme cases, in some way, in this country. Cleveland was one of the pioneers in the introduction of the trolley system, and they had the disadvantage which all experiments have. They had very noisy cars, many break-downs, and a great deal of opposition. For the last year I have had occasion to sound public sentiment a good deal, and I find that the people would not think for a moment of going back either to horses or to change over to the cable system. They have one cable line in Cleveland. All the others, with one exception, fare electrical lines, electricity being in a very large proportion. The electric line is parallel with the cable, and

Q. Is there any depreciation of property in Cleveland on the trolley lines?

A. No, sir; property has been built up there in a marvelous way. I mean the value of property all over. They have

four tracks on one street—Superior Street—for about three blocks.

Q. Is Euclid Avenue in Cleveland?

A. Yes, sir.

Q. That is claimed, I believe, to be the finest avenue in the world?

A. Yes, sir.

Q. Do you have it there?

A. Yes, sir.

Q. That is the avenue on which your wealthy people have their handsome residences?

A. Yes, sir; but on one portion of the avenue there is no car line at all. That is far out. Cars run under the avenue about a mile, and from that time they run along through a very fine residential district.

Q. Do they run single or double tracks?

A. Double tracks, and that portion which parallels the finer portion of Euclid Avenue—Prospect Street—they have almost as fine residences as can be found in any part of the city.

Q. You say there has been no depreciation, but an appreciation, of property?

A. I think the appreciation is all over the city without any question.

By MR. BULLITT:

Q. You speak of the fact that you think property has rather appreciated there. What is the width of that avenue?

A. I cannot tell you in feet. The avenue is very broad. I suppose it is perhaps eighty feet. It must of necessity be broad in order to have four tracks. Prospect Street, from which the electric cars run, is probably thirty-five feet wide, and upper Euclid Avenue is the same way. The streets are all quite wide in Cleveland.

Q. What is the width of the sidewalks there?

A. I do not know whether I can tell you that or not. I should say about eight feet wide—eight to nine feet wide.

Q. How far, as a rule, do the houses set back from the streets?

A. On Prospect Street they set on the curbstone about double the width of the sidewalk—in some cases, more than that—three times.

Q. How much width would that give, as a rule, between house and house on opposite sides?

A. I have paid very little attention to measurements and my opinion would not be worth very much.

Q. Isn't it quite wide?

A. It is quite wide on some of the streets; it is eighty feet wide perhaps from house to house on some of the streets.

Q. On Euclid Avenue, what is the width?

A. On that avenue where the cars run, I presume it is one hundred feet from house to house. As I say, my opinion is not of very great value on that subject.

Q. Are not the streets there, from your recollection, as a rule much wider than our streets are?

A. Yes, sir; they are, as a rule, although I have not seen the outlying portions of this city. I have seen the business part of Philadelphia.

Q. They are much wider than our steeets, so far as you are familiar with them?

A. Yes, sir.

Q. I mean leaving out Market Street and Broad Street, but taking the others?

A. Yes, sir.

Q. As a rule, is it not true that your streets are wide enough so that persons in driving along meeting these cars can have room enough for their horses, if they are at all excited or alarmed, to be reined in and not to run away, rear, or shy in close proximity to the car on to the sidewalk?

A. Well, I should not want to educate a horse in any double-track street.

Q. The narrower the place that you are driving in, the greater danger you think would come from the attempt to educate him, would you not?

A. Yes, sir; undoubtedly.

Q. You have spoken of the perfection of this system. I understand you to say that if this system as used now was

adopted under the known appliances you would consider the danger reduced to a minimum ?

A. Yes, sir. In other words, I believe that you can operate an electric road on a large scale with less accidents to human life from every cause than with the cable system and—well, I do not know that I can say with the horse system. I presume that would not be true, but with the cable system, certainly.

Q. Are there not very many of the systems that have been operated, however, that have been made imperfect by people who have not had these guards against danger, of which you have spoken ?

A. Yes sir.

Q. Hasn't that been very largely the experience throughout the country ?

A. Yes; it has been in all roads built perhaps to within a year or a year and a half ago. I say all. I mean some roads. There have been some roads built without regard to expense, where their operation has been as perfect as it could probably be now, except for the slight advantages in mechanism, &c., which always come with time.

Q. But very many have been so imperfectly constructed that they have been liable to these accidents ?

A. Yes, sir; that is true.

Q. Is it not true that very many of these reports which have been published in the newspapers from time to time—while many of them have been inaccurate yet that many of them have had more or less foundation for the statements made, owing to the imperfect systems which have been in operation ?

A. Well, now, I will say, speaking honestly, that I have not seen during the last year or two in the newspapers, any statements by uneducated newspaper reporters or anybody else that men have been killed by the trolley system, with one or two exceptions; and those exceptions have been quickly traced down and found incorrect. Misstatements have been largely put in rather an ambiguous way—that an electric wire fell; or that an electric light wire fell; or a trolley wire fell.

And it has been more a matter of knocking down a horse than killing when a trolley wire has fallen. I can think of no case within my remembrance where there has been any clearly stated newspaper report of any one being killed or seriously injured by a trolley wire.

Q. Still you are aware of the fact that there has been a prevalent atmosphere running through the newspapers which would indicate that they believed the trolley system to be objectionable on account of accidents being liable to happen through it ?

A. Yes, sir; that is the impression, certainly.

Q. That is based upon what you deem to be incorrect information, but still it has existed ?

A. Yes, sir. I think that one of the difficult things for the people to understand is the reason why a current should be strong enough to propel one hundred loaded cars, and yet not be strong enough to kill a man. I presume that has been very carefully explained here in the course of this investigation.

Q. Yes, we have gone into that very thoroughly. Now, would you not say, if you were going to construct a system of transit by the use of a trolley overhead wire, that you would deem it essential that you should perfect that system and perfect the engineering provinces connected with it to as great a degree as was possible, under present known circumstances that exist ?

A. Yes, sir; certainly.

Q. And that every guard should be adopted ?

A. Yes, sir; at the time of invention. Of course, if Stephenson's engine had not been adopted at the time it was, we would not have had Corliss' engine, but there should be used the most modern appliances in every way.

Q. In other words, would you not consider that it was just one of those agencies, which, if handled in the way of which you have spoken, may be comparatively harmless, and if handled carelessly, ignorantly, or negligently, may be dangerous ?

A. Yes, sir; certainly.

By MR. SHAPLEY:

Q. Is it not to the immediate pecuniary advantage of a company, which would undertake to put up a trolley system now, to put up the very best that ingenuity has devised?

A. Without question; I do not suppose that a company cares to pay $5000 for lives lost, in my opinion.

MR. BULLITT:—Mr. Chairman: I have heretofore stated that I would like to offer, if it arrived, some information from Newark, and with the permission of the committee I would like to read a letter, and possibly to supplement that by calling the persons who have obtained this information. I now read a letter dated March 16th, 1892, from Mr. Cortland Parker, who I think is known by reputation to almost everybody as being one of the most prominent men in the State of New Jersey. This letter is addressed to myself. (Reading same.) This letter comes from a visit paid yesterday to Newark by Mr. Stokes and Mr. Wister, who went there for the purpose of ascertaining how far the people of Newark would confirm the statements made by the mayor of Newark before this committee. I would like, with the permission of the committee, to call Mr. Stokes for the purpose of showing what information he gained there with reference to this subject. I would state that these gentlemen were not able to give time enough to obtain written statements. They only went over there yesterday afternoon, arriving there at a late hour, and I told them that they must be back here to-day by 12 o'clock.

MR. STOKES, examined:—

By MR. BULLITT:

Q. You live on Main Street, Germantown?

A. Yes, sir.

Q. You are opposed to this system of trolley overhead wire, and have been very active in that opposition, have you not?

A. Yes, sir.

Q. Did you and Mr. Wister go to Newark yesterday at my suggestion for the purpose of getting information on this subject?

A. Yes, sir.

Q. State the result of your observation, and the information you obtained with reference to the feeling of the people over there upon the subject?

A. Of course, it will be understood that we had quite a short time in which to get any very large amount of information, but at the same time we arrived there about seven o'clock last evening, and I left at about half-past ten this morning. Mr. Wister was there a couple of hours longer; in that time we had an opportunity to see a good many people, whom we knew or knew of, and others whom we spoke to casually; also to go along the streets and hear these cars in Newark, and to form our own impressions individually from what the people had to say about the subject. I am myself pretty familiar with trolley cars. I have traveled in a great many cities that have used them, and I have slept under them, ridden on them, and driven by them, and know them in most of the cities of the West, but we had heard this account of Newark's especial case from their mayor, and I was anxious to obtain information, being interested in the subject.

We saw Mr. Cortland Parker, who stated about what is contained in the letter which you have just heard read. We then called on Mr. McCarter, a prominent lawyer living on Market Street, Newark, which is one of the broad streets there on which they have no trolley cars. We asked his impression, and he said this: that the people universally said that it was good transportation—there was no denial of that—but the people on Market Street were very apprehensive of having it come along the street, and very much opposed to it coming along their street.

We also called on Mr. F. C. Jackson, who lives on one of the side streets. I am not familiar with their names, but I can tell you about its width. He lives on a broad street on which there is no trolley. He is an old gentleman, I think very fair and unprejudiced. We told him what we wanted, and that we were opposed to it. He said, "Well, I am afraid I can't help you." We asked him on what ground, and he said, they ran up to the side of his house there and made

it convenient to him to get home. I asked him about the noise, and he said it was objectionable unquestionably. Then I asked him how he would like to have it in front of his house. He said that would be very objectionable, and he would not like it at all. I asked him also his impression as to the effect upon the value of his property. He said that he had reason to know that if he went to sell his property it would not bring within fifteen, twenty, or twenty-five per cent. of what it would bring previously to this, but he wanted to live there and didn't want to move away. He was one of the most favorable men that we found to the trolley system in Newark. I give it to you just as he gave it to us.

We also saw a doctor who lived in a rather narrow street, probably sixty or fifty feet from curb to curb. He was one of Newark's prominent physicians. He said that he was very much opposed to it at first. He was opposed to the disagreeable parts of it at the present time, and as to his own property, but he came back to the fact that it was good transportation. He said that he had two lots by the side of his house that he had been trying to sell for three or four years. He had an offer three years ago of $3500. He had since offered them for sale at $2300 or $2400, and could get an offer of only $1800. He said that unquestionably his property had suffered up to the present time. What it might be in the future he did not know. Those were the only people that we went to with any degree of personal knowledge, but we talked upon the street and found that the sentiment was very much against the discomforts of it, although they liked to get around quickly, like we all do. They all seemed to be pretty well satisfied to have it in the town, but we did not find one single individual, with the exception of this Mr. Jackson, who was at all reconciled to the fact of having it go by his own property. They would like to have it go by somebody else's property. We asked them in a general way whether they were familiar with Philadelphia streets, and they made no hesitation in saying at once that they thought it would be a very bad thing for Philadelphia. As to our own personal impressions of the noise,

the old cars are very noisy. It has been stated by one of the experts that the new cars made nothing like so much noise. The noise of humming is not eliminated probably on any cars. You can hear the old cars certainly for a block and a half or two blocks. My impression was in this part of Philadelphia, if it comes, you will have to take the noise with it. I would rather take the motors that had the noise in them or else have a whistle on those cars like a locomotive whistle.

Q. Why do you want that noise?

A. I think it would be an element of safety. I think those cars ought to have some means of giving notice of their approach to a crossing.

Q. Do they not give that by gongs?

A. Yes, sir; to a certain extent, but they do not stand much chance on those cars they approach so rapidly. The complaint that we had was that when they first installed those cars the drivers, of course, had it in their power to run them at almost unlimited speed, and would do so, and the police would have to stop it, and did to a certain extent. But they had an advantage in Newark that we do not have here—that the houses are set back from the fence quite a distance, leaving a yard so that if you go up a street you can cross the yard and see the cars probably a quarter of a square before you get to the crossing. Here, of course, the houses run right to the corner, and we can all appreciate the difference.

Cross-examination.

By MR. JOHNSON:

Q. How far did you travel from the centre of the town?

A. We traveled out from the centre of the town, I suppose, probably six or eight lots. I am speaking about the thickly built-up portion of Newark. I am not speaking of the suburbs.

Q. Then you kept your inquiries in the very thickly built-up portions of the city?

A. Yes, sir.

Q. And the result was that they thought it was a good thing for them, but that it would be a bad thing for Philadelphia. Was that the result?

A. No, sir; I found that every man where it went past his own door objected to it very much, but that, as a matter of transportation, they did acknowledge that it was good transportation and got to be quite well resigned, most of them, to having it by somebody else's door instead of their own.

Q. How many people did you call on?

A. Four or five, but, I suppose, we talked to twenty or thirty.

Q. How did you diagnose the places where you called—were you told to go there, or did you just guess that a certain place would be a good place?

A. No; these two gentlemen, whose names we know, were the only ones whose names I know that we talked to.

Q. Who gave you their names?

A. Mr. Bullitt gave us the names of two of these gentlemen.

Q. They were both lawyers?

A. I believe so; yes, sir.

Q. About how many miles of electric railways are there in Newark?

A. I do not know; I didn't go into that. I was not there long enough.

Q. About how many miles did you travel in that pilgrimage that commenced at seven at night and ended at ten and a half this morning?

A. You misunderstand me. We did not keep it up all the time.

Q. You did not paint the town quite that red?

A. No, sir.

Q. About how many miles did you walk in your effort to gather public sentiment?

A. I suppose we walked probably three, four, or five miles.

Q. Up one side and down the other?

A. No, sir; we did in some few cases. We tried not to do that. We rode on the cars long distances, and then took up certain objective points—very rapidly, too.

Q. What would be the principle of selection upon which you would go in stopping a man, and how did you stop him to gain information?

A. I will give you one or two cases to illustrate that. As I said, we walked quite a considerable distance and viewed these cars more interestedly from the outside than from the inside. That is one reason why we walked more than we rode. After all that effort we were naturally a little hungry, and went into an oyster saloon on Broad Street, where we had some oysters. One man was serving these refreshments, and I said to him, "I see that you have none of these electric cars on your street." He said, "No." I said, "Well, I should think you people would get up a petition to have them here; your neighbors are enjoying more privileges and luxuries than you are." He said, "No, sir; for heaven's sake! We never want them on this street." I said, "Why not?" "Well," he said, "they are noisy and getting out of order." He was not an expert, but he said that it was disagreeable, their stopping and getting out of order, and that he wouldn't like to live along the line of such a route.

Q. Then I suppose after he told you that you ordered oysters?

A. That was done before. It was while the oysters were being cooked. That is a sample of the places. I asked him the question as if simply for information, and in a general way, and in a perfectly fair way. We saw twenty or twenty-five people, and seventy-five or eighty per cent. of them had very little to say in favor of such a road; in fact, none were in favor of it, except that it got you along in good shape—that it was good transportation—and every one said that the disadvantages of that system were great, and that the annoyance was great.

Q. You did not ask anybody, however, who had any long distance to travel, any workingman, for instance, whether he thought it was an advantage to be able to save time in getting to his work, did you?

A. Well, I suppose there would be but one answer to make to that. It would not be necessary. I would like myself, if I want a long distance, to have good transportation.

Q. And you think that is good transportation?

A. I think it is. I think that has never been denied.

Q. Did you ask them whether they knew their mayor—any of these people?

A. Yes, sir.

Q. Did you ask them whether he was a representative man?

A. Well, I would rather you would not ask that question.

Q. Is that because you got a bad opinion of him from what you gathered?

A. No, sir; it is because he came over here so kindly, for our benefit, last Monday, that I think I would be very ungrateful to state what we heard in Newark.

Q. I take it for granted that, as he had been re-elected four times, you heard from the people who elected him a very bad opinion of him as a representative man?

A. I did not hear from the people who elected him, I suppose. I do not know whether they were such people or not. He stated, I believe, that he had been in there for eight years. That is a question that I do not care to answer. Of course, people discuss methods and means, &c.

Q. You have been interested in opposing this system for some time. Why did you not make a visit to Newark earlier?

A. Because we had not had it presented to us in such a glowing light as we had last Monday. I have seen it in many other places where I had made visits, but I had never made a visit to any city before expressly for that purpose.

The following Letters from Mayors, Heads of Departments, Insurance Brokers, and others in cities where the Trolley System is in actual operation were read by the clerk.

OPINION OF THE TROLLEY SYSTEM AS EXPRESSED BY MAYOR MATTHEWS OF BOSTON.

Extent of the System.—The trolley wire was introduced some three years ago, and is being gradually extended, so that in a short time it is expected to entirely supplant the use of horse-cars.

Public Opinion.—While there are many persons who are opposed to the trolley system as more dangerous than horse-cars, I am inclined to think that the greater number are in favor of the system, at least as compared with anything that preceded it. An attempt was made to run electric cars by means of a conduit, but for some reason or other it proved a failure; and the general idea now seems to be that the trolley system is the best that we have had for surface travel, and the best that we can have until the adoption of a storage battery system be found practicable. It has been found, I believe, that the electric cars are sought by passengers in preference to the horse-cars where they have a choice, and the fact that they can be propelled so much faster where the streets are wide enough and sufficiently free from other travel seems to be an unanswerable argument in favor of the system, so far as the residents of the outlying sections of the city are concerned. In so far as their use in the narrow streets of the business section of our city is concerned, there seems little to choose between electric cars and horse-cars. A slow rate of speed is necessary and while there is perhaps more danger from the electric cars, there is a compensating advantage, on

the other hand, in that the streets can be kept much cleaner than where horses are used.

On the whole, therefore, the best thought that I have been able to give to the matter leads me to the conclusion that the trolley wire system, while by no means an ideal one, is on the whole superior to anything that we have had, and is generally regarded by the people with favor. If we could ever get our narrow and crooked streets in the centre of the town straightened out and a number of tracks removed and the classes of travel that use the streets separated, so as to have the electric cars confined to certain streets and allow teams to have the monopoly of others, I believe that the system would be a material factor in solving the vexed problem of rapid transit in this city; and in the meantime I think that on the whole the change from horse to electric has been a distinct advantage to the city.

Yours very respectfully,

N. MATTHEWS,
Mayor.

BOSTON, March 10th, 1892.

P. A. B. Widener, Esq., Philada.:

MY DEAR SIR:—The sentiment in favor of the electric system in this city and suburbs is well-nigh universal. The only complaint regarding it is that we do not introduce it faster than we are doing, and we are putting on from thirty to fifty electric cars every month in place of horse-cars.

I could send you scores of letters from improvement associations in different sections, but they are all of the same tenor; and without consultation with the writer of the letter herewith inclosed, I send this as a specimen of the letters we are constantly receiving, urging the introduction of the electric system.

If your city government would appoint a committee to come here, and ride on our cars and talk with the passengers, I am sure they would have no doubt as to the popularity of the system.

Yours truly, HENRY M. WHITNEY,
President.

CITY OF ALBANY,
MAYOR'S OFFICE.

ALBANY, March 14th, 1892.

Mr. P. A. B. Widener, President Philadelphia Traction Company:

DEAR SIR:—In answer to your inquiry as to the experience of Albany with the trolley system on street-car lines, permit me to say that nothing could induce Albanians to return to the antiquated system of horse-cars. There was some opposition to the adoption of the system when it was first proposed, but, since the spring of 1890, when the cars first began to run, there has not been an accident due to the trolley wires, the city has had rapid transit, and the value of property, both in the suburbs and on the streets through which the lines run, has steadily increased.

It is my opinion that the overhead trolley is the best system for operating street-car lines, and in this opinion even those Albanians who first opposed the system coincide with me.

Very respectfully,

JAMES H. MANNING.

MAYOR'S OFFICE,

BUFFALO, N. Y., March 11th, 1892.

Philadelphia Traction Company, Philadelphia, Pa.:

I am directed by Mayor Bishop to acknowledge receipt of your communication of the 9th inst., and in reply to say:—

The people of Buffalo generally prefer the trolley system for street-car motive power, and would not return to horse-power; they are very desirous of having it substituted on all the lines of street railway here.

Property has not depreciated on the streets through which trolley cars run, so far as I can learn.

The fire department has not as yet been disturbed or delayed by reason of the wires.

I do not recollect any deaths that were directly occasioned by the railway wires. The only fatal accidents, I believe, have been occasioned by the cars themselves, and the number is not very large.

Respectfully,

JNO. W. FISHER,
Secretary to the Mayor.

PITTSBURGH, March 11th, 1892.

Messrs. Widener and Elkins, Philadelphia, Pa.:

GENTLEMEN:—I can say that the overhead electric system with trolley attachments for electric street railways has given satisfaction in the city of Pittsburgh. There has been no complaint made of any kind by the citizens along the route of the several companies operating in this city; neither has there been a single accident of any kind caused by the overhead system. It has been operated successfully during the past two years.

Very respectfully,

EDWARD M. BIGELOW,
Chief, Department of Public Works.

PITTSBURGH, PA., March 11th, 1892.

Messrs. Elkins and Widener, Philadelphia, Pa.:

GENTLEMEN:—Under an ordinance regulating electric street railways, all overhead and electric street railways are in the department of public safety and are controlled and regulated by the bureau of electricity, and our experience with the trolley system in use by the various electric railways of the city of Pittsburgh, they are safe and are not a menace or dangerous to life and property, and have, so far, proved to be of little inconvenience to the fire department. Those electric wires which are the chief hinderance and trouble with reference to the fire service comes from the electric light and telegraph, as well as telephone system. The trolley wires of

the various street railways, being in the middle of the street, have not, so far, seriously interfered with the fire department of the city of Pittsburgh, and we have never had a fire or accident in the city of Pittsburgh caused by the wires of the various electric street railways, and as chief of the department of public safety I cheerfully testify that they are not detrimental to the city of Pittsburgh.

Very truly yours,

J. O. BROWN,
Chief, Department of Public Safety.
Per J.

CLEVELAND, March 11th, 1892.

P. A. B. Widener, Esq., President Philadelphia Traction Company, Philadelphia, Pa.:

DEAR SIR:—As regards the overhead wire system of electric cars now in use in this city, I would say that the electric cars are now giving entire satisfaction, and I do not believe that the citizens here would consent, under any circumstances, to return to the old horse system. It has undoubtedly increased the value of property in the suburbs, and we do not find it any more dangerous than the cable, and, on the whole, it gives better service and much quicker transit.

Yours respectfully,

DAVID MORISON,
Director of Charities and Correction.

BOSTON, March 10th, 1892.

P. A. B. Widener, Esq., President Philadelphia Traction Company, 423 Walnut Street, Philadelphia, Pa:

MY DEAR SIR:—The sentiment in favor of the electric system in this city and suburbs is well-nigh universal. The only complaint regarding it is that we do not introduce it faster than we are doing, and we are putting on from thirty to fifty electric cars every month in place of horse-cars.

I could send you scores of letters from improvement associations in different sections, but they are all of the same tenor; and without consultation with the writer of the letter herewith inclosed, I send this as a specimen of the letters we are constantly receiving, urging the introduction of the electric system.

If your city government would appoint a committee to come here and ride on our cars and talk with the passengers, I am sure they would have no doubt as to the popularity of the system.

Yours truly,

HENRY M. WHITNEY,
President.

BOSTON, March 6th, 1892.

Frank H. Monks, General Manager, W. E. R. R., 81 Milk Street, Boston, Mass.:

DEAR SIR:—I am chairman of the committee on travel and transportation of the East Boston Citizens' Trade Association, and on behalf of that committee I ask if you can inform us whether or not it is the intention of the West End Company to introduce electricity upon the East Boston Division road, and, if so, how soon our citizens can expect that improvement. The present inconvenience to which we are subjected from overcrowded and poor cars has been so often presented to you that it is not necessary for me to refer to it further than to say that we are patiently waiting, expecting that with the introduction of electricity we shall receive better accommodations through the use of larger cars and more of them.

The reason that I ask for this information at this time is because I am making up the final report of the committee for the season, and it would be a gratification if that report can include a statement of an assurance from you that this much-desired improvement may be expected in the near future. If you can add any other information it will be gratefully received.

Allow me to state also on behalf of the committee that they think that the traveling public of East Boston fully appreciate the improvement in the service on the city side on the East Boston lines through the recent introduction of electricity as a motor there.

Yours respectfully,

JOHN L. BATES,
B.

CLEVELAND, March 11th, 1892.

P. A. B. Widener, Esq., President Philadelphia Traction Company, Philadelphia, Pa.:

DEAR SIR:—Being a frequent patron in this city on both the cable and electric street railways, as well as the old-time horse-cars, I beg to say that I am fully convinced that the electric system is the best one to be used in the place of the old-fashioned horse-cars, and I know of no city that the same could be adopted to so good an advantage as the city of Philadelphia. I would be very loth to see any change made in this city, where I am satisfied that the use of the electric cars has enhanced the value of property very largely.

Yours respectfully,

J. K. BOLE,
Chairman Finance Committee, Cleveland City Council.

OFFICE OF COMPTROLLER.

ALLEGHENY, PA., March 12th, 1892.

Messrs. Widener and Elkins, Philadelphia, Penna.:

GENTLEMEN:—In reply to your request I would say that the overhead electric system of street railways have been in use in this city for several years, and I believe have given satisfaction to our people. It is true that we have had a few accidents, but these have been caused mainly through the carelessness of the parties injured. We have a number of

electric lines in our city, and I am of the opinion that the overhead system is perfectly safe and reliable.

Very respectfully,

JAMES BROWN,
Comptroller.

ALLEGHENY NATIONAL BANK.

PITTSBURGH, PA., March 11th, 1892.

Elkins and Widener, Philadelphia, Pa.:

GENTLEMEN:—In answer to your request asking my opinion of the overhead wire system of electric street railways, would say that when the right was first granted in this city I was fearful that it was a great mistake, and dangerous and annoying to the people living and doing business on the streets to be used. But I am free to say that after a trial in our city for the last two years I think it a great improvement and help to business, and that it has enhanced the value of suburban real estate greatly.

Respectfully yours,

JNO. CALDWELL, JR.

CITY OF CINCINNATI.

MAYOR'S OFFICE.

MARCH 11th, 1892.

Philadelphia Traction Company, Philadelphia, Pa.:

GENTLEMEN:—Your letter of the 19th inst., asking my opinion in regard to the electric trolley system, is at hand. I beg leave to answer:—

First.—Would the people revoke the trolley franchise to revert to horse-power if they could? No.

Second.—Has property depreciated in value adjacent to overhead wire railways? No.

Third.—Does the fire department encounter insurmountable obstacles in their work? It is true they are an obstruction to firemen, but not insurmountable; but this is one of

the great objections to overhead wires of any kind. There has been no deaths attributed to overhead railroad wires, except that of a horse caused by a break in the wires.

Respectfully submitted,

JOHN B. MOSBY,
Mayor.

CITY OF CLEVELAND, OHIO.

OFFICE OF THE CITY CLERK.

MARCH 11th, 1892.

P. A. B. Widener, Esq., President Philadelphia Traction Company:

DEAR SIR:—In response to your communication I would say that seven years experience in municipal government has convinced me that the use of the trolley system for the operation of street-cars has not had the effect of depreciating property, but on the contrary has proven a very substantial benefit to the same. It certainly has not been as dangerous a system to life as the cable, and but little, if any, more dangerous than horse-cars. As far as this city is concerned the introduction of rapid transit by the trolley system has been a great boon to thousands of our people whose homes are distant from the business portion of the city, and they would certainly not, under any circumstances, return to any slower means of transit, even if less dangerous.

Of our one hundred and seventy-five miles of street railway lines one hundred and fifty miles are operated by the trolley system, with the exception of one line which is about to be equipped with it.

One of the objections raised to overhead wire street-cars has been the noise with which they were operated, but this objection is being rapidly done away with by the use of modern improved electrical improvements here.

I have the honor to remain

Very truly yours,

HOWARD H. BURGESS,
City Clerk.

AMERICAN CASUALTY INSURANCE AND SECURITY CO.
OF BALTIMORE CITY.

CLEVELAND, O., March 11th, 1892.

P. A. B. Widener, Esq., President Philadelphia Traction Company, Philadelphia, Pa.:

DEAR SIR:—Your general letter of recent date asking for some data as to the effect of the introduction of electrical apparatus on the street-car lines of this city, and as to what effect it has had on the rates in writing fire insurance, has been handed to us for attention.

We are particularly interested in this question, namely, as to what increase in fire insurance premiums electric railways have brought about. We wish to say emphatically that there has been no increase whatever in insurance rates here for the reason above named. The experience of two or three years which our insurance companies have had here convinces us that no argument can be made that will show that electric street railways increase the general fire hazards of a city in any way. We might also advise you that we are heavy insurers of both electric and cable systems in Ohio, West Virginia, and Western Pennsylvania, and with our experience in this particular line we reiterate what we have above written. This objection raised by your people against the introduction of the electric railway system must surely be based upon prejudice or on some unknown reason, as certainly no evidence to support it can be obtained from fire underwriters to that effect. This city has about one hundred and fifteen miles of electric street railway in successful operation.

Hoping that we have been able to throw some light, we remain,

Yours very truly,

BINGHAM, DOUGLASS & SQUIRE,
General Agents.

Dictated, C. B. S.

HOUSE OF REPRESENTATIVES, UNITED STATES,
WASHINGTON, D. C., March 13th, 1892.

Messrs. Widener and Elkins, No. 423 Walnut Street, Philadelphia, Pa.:

GENTLEMEN:—In answer to your inquiry as to the relative advantage of the trolley system over other means of street-car propulsion, permit me to say that I have given the subject careful consideration for the last five years, and my opinion is that beyond any question of doubt the overhead trolley system is to-day the most practical plan of rapid transit for any city. In Cleveland and St. Louis, where I am interested in street railroads, there are no objections to overhead wires and the operation of cars under that system is the most popular. Where the poles and wires are put up properly they can be made ornamental.

The objections urged in the beginning that they were dangerous, interfered with the fire department, and were generally unsightly, has entirely disappeared, and the bitterest enemies of the overhead system have become its best friends.

I have investigated very carefully the storage battery, and without attempting to say what may be developed hereafter, I am positive that they are not a commercial success, the cost of operation being in every case greater than the receipts, and the service very poor, both in speed and reliability.

The only practically successful electric roads to-day are those operated by overhead wires.

It is entirely practicable to put the feed wires under ground in the centres of large cities, and this should be required, as the feed wires are the only unsightly features of the electric system.

Yours very truly,

FRANK L. JOHNSON.

CLEVELAND, O., March 11th, 1892.

P. A. B. Widener, President Philadelphia Traction Company, Philadelphia, Pa.:

DEAR SIR:—In reply to your inquiry, "What is the effect of the electric railway upon the value of suburban property?"

I have to say that in Cleveland it has been in every way to the credit of the electric railway. Since the first car was put on the East Cleveland line of this city a complete change has taken place in the real estate market, and property four, five, and even eight miles from the public square has greatly increased in value. I think that the statement that this increase amounts to thirty-three per cent. is a conservative one.

Yours truly,

J. G. W. COWLES,
R. M. PARMELY.

ARGUMENT OF RUFUS E. SHAPLEY, ESQ.

Mr. Chairman and Gentlemen of the Committee:

Either I entirely misunderstood the purpose for which you were brought together, and the issue before you, or Mr. Bullitt deliberately ran away from that issue. I had supposed, and I think I had a right to suppose, from the multitudinous literature on the subject which I have read in the newspapers, that you were sitting here for the purpose of hearing the testimony of experts and the arguments of counsel to determine whether this trolley system is or is not as objectionable as it is represented to be; whether it is a system that can be safely introduced into Philadelphia, or one which should be excluded from it. That was about the only question in the most remote degree connected with the subject of street-cars to which Mr. Bullitt made no allusion. I shall certainly not attempt to follow him through his review of the ancient history of this city in relation to street railroads, for I conceive that it has no earthly bearing on this question. Nor shall I follow him into a consideration of whether these ordinances ought or ought not to contain more restrictions than they do contain. He spoke for an hour an thirty minutes, during at least an hour and twenty minutes of which he devoted his attention entirely to those two subjects, and the only time when he even approached what I understand to be the question here was when, in a dramatic manner, he spread out before you the protests of (as he alleged) seven thousand two hundred and sixty-three people (which he had kept carefully hidden away in his carpet-bag, so that no one could examine them), representing (as he claims) thirty-six thousand people, assuming that each person who signed was not a servant girl, but a householder and at the head of a family. I confess that I was astounded. I had

supposed from the wholesale misrepresentation on this subject that he would present to you protests signed by from one to two hundred thousand people, because I knew perfectly well that with the misrepresentation and exaggeration of this subject with which they were diligently filling the minds of the people of this city, there would not be the slighest difficulty in getting any person, wholly ignorant of the subject, to accept as verity what such respectable people told them.

But as there are about four hundred blocks of squares which are covered by these ordinances, and as I think we may safely assume that there are twenty houses on each side of a block on the average on those streets, allowing twenty feet front, there must be some sixteen thousand houses that are directly interested in this matter by reason of their being on the streets on which it is proposed to put this system; and if Mr. Bullitt's theory is correct, there must be at least eighty thousand people living directly on these streets. If so, he has succeeded, by this system of misrepresentation to which I shall refer hereafter, in procuring the signatures of less than one-half of the people whom they have been endeavoring to persuade that their property will be vastly depreciated by the introduction of the trolley system.

I do not want to dwell on this subject, but of course you all understand very thoroughly that these streets do not, as a rule, comprise the streets occupied by the people of wealth, leisure, and the highest amount of education. I presume the majority of them are streets on which plain, every-day, matter-of-fact, business people and working people live. You can easily understand how easy a thing, therefore, it is to go to people of that character—who probably have never seen a trolley system in operation and who know absolutely nothing about it—and by telling them as they did, and have done from the first, that this system is intensely hazardous to life and limb, to property and horse, and that the experience of every city into which it has been introduced has been that the property all along the lines has depreciated from twenty to thirty per cent. in value—to get their signatures.

So that, conceding everything to the protestants, and admitting that Mr. Bullitt is correct in his assumption that the seven thousand two hundred and sixty-three represent thirty-six thousand people, or nearly thirty thousand people more than have signed it, we have still less than one-half of the actual property-owners and residents on those streets protesting. But, of course, you understand that the people who are directly and immediately interested in this system are not limited to those who simply live along the line of these streets. It is perfectly safe to assume that if this system should be introduced, and if it should result in rapid transit, or at least in more rapid transit than we now enjoy in Philadelphia, every person within two, three, or four blocks of each street on which it runs in each direction will be directly interested in it, so that in the immediate neighborhood of these streets we can very safely assume, counting only two squares in each direction, that there are at least four times as many houses as there are on the streets themselves. On the basis of five people to a house there would then be over three hundred thousand people within two blocks of this system, and therefore the direct and immediate sharers in any benefit resulting from it. You will also remember that the population of this city is a million and fifty thousand people in round numbers, and that, if Mr. Bullitt is correct, these seven thousand two hundred and sixty-three signers (not servant girls) represent, at the outside, not more than thirty-six thousand out of a million and fifty thousand people, leaving a million and fourteen thousand people whom *you* are supposed to represent.

Instead of attempting to follow Mr. Bullitt in his discourse on the ancient history of street-car companies and the franchises granted to them, I propose to consume a very short portion of your time by discussing what I believe to be, and what I think every member of the committee understands to be, the only question which you came here to consider; that is, the wisdom or unwisdom of permitting the introduction of this trolley system into Philadelphia.

The protests against this measure come from four different classes of people :—

1. Those who are pecuniarily interested in elevated road or storage-battery schemes, or rival street railway combines, and who have, therefore, a direct pecuniary interest in trying to defeat these ordinances.

2. Those who habitually oppose progress or improvement of any kind.

3. Those who habitually sign any petition or protest they may be asked to sign, and

4. A very large number of highly respectable and estimable people, who, having no actual knowledge of the trolley system, have been led to believe, by the exaggerations and misrepresentations of interested parties who are managing this opposition, that the trolley system is in some way highly dangerous and objectionable.

Now, everybody admits two things: First, our great need of rapid transit, and, secondly, that it is much more desirable to have electric wires underground, whenever they can be put there.

But, knowing from experience the inestimable advantages of the telegraph and electric light, none of us would consent to do without them on account of the overhead wires—if it were impossible to put and operate the wires underground.

No system of transit, rapid or slow, has ever been or ever can be devised, to which there are not some unavoidable objections.

The test by which you must decide whether these ordinances should be approved or rejected is this: Will the advantages from the use of this system be greater than the incidental disadvantages? If we were to reject every public improvement because of some incidental disadvantages, Philadelphia would stand still or actually go backwards, while other rival cities would soon out-distance it.

And right here let me remind you that the history of this city shows that every measure looking to its advancement during the past hundred years has met with similar unreasoning opposition.

Always Enemies of Progress.

As long ago as 1789 we find that fourteen hundred full-grown men in this city actually protested most solemnly against the passage of an act to incorporate it, alleging that they would thereby be "subjected to an aristocratic police," and that the experience of their forefathers in England had shown the mischievous effects of incorporating."

Ten years later, in 1799, we find the same class of people protesting against the erection of the first water-works, on the ground that their old-fashioned wells and pumps were quite sufficient.

A few years later, in 1812, we find them protesting against the introduction of coal as fuel. In 1828 we find them sending a memorial to Congress seriously asking it to prohibit sales of goods by auction, on the ground that auctions tended to promote thievery, to ruin the importing trade, to injure commerce, to debase public morals, and to increase the price of merchandise.

In 1833 we find them solemnly protesting against lighting the city with gas, alleging that it was "an article as ignitable as gunpowder and as fatal in its effects;" that "it would, by explosions and conflagrations, cause an immense destruction of property and an appalling loss of life;" and that "it would destroy the immense shoals of shad, herring, and other fish with which the Delaware and Schuylkill Rivers abound." And this celebrated and solemn protest is signed by the forefathers of many of the signers who now protest against running cars by electricity on substantially the same grounds that were then urged against the use of gas. And among the signers we find the names of such eminent lawyers of that day as Horace Binney, John Sargeant, Benjamin Chew, William J. Duane, Joseph P. Norris, and William Hirst, and of such citizens as Dr. Physick, Hartman Kuhn, James C. Fisher, John C. Cresson, Matthew Newkirk, Paul Beck, and hundreds of equal intelligence and prominence.

Later on, in 1858, when it was proposed to introduce street-cars on Fifth and Sixth Streets, on Arch Street, and on Chest-

nut and Walnut Streets, we find the same class of Philadelphians protesting against this desecration of our streets, the largest property-owners and storekeepers on Chestnut Street actually threatening to move away from those streets, and even from the city itself, if their protests were not heeded. So revolutionary were the pamphlets with which they flooded the Capitol at Harrisburg that the legislature of 1858 was intimidated, and the bill to allow street-cars on Chestnut and Walnut Streets was not passed until a new and braver legislature met in 1859.

Again, in 1867, when it was proposed to run street-cars on Sunday, so that church-going people could ride to their often far-off churches, and that tired-out workingmen with their wives and children could get out of the over-heated city into the country to get a little pure air once a week, we find the proposition meeting with similar opposition, and the same class of people beating at the doors of the Supreme Court, and clamorously demanding that it should restrain such desecration of our streets by injunction.

As late as 1887, the very leaders of the present opposition, who now say "give us cable-cars," held town meetings and nearly scared Governor Beaver into fits by the violence of their protests against an act authorizing the incorporation of traction-motor or cable companies.

Philadelphia Going Backward.

So it has been with every measure tending to lift Philadelphia up from the condition of a provincial village to the dignity of a great city. And the result has been that instead of its now being what it was during the Revolution—the commercial metropolis of this country—we hold but third place, and are likely soon to lose even that rank. It is not much wonder that the business men of New York and Chicago—yes, and of Pittsburgh and a score of Western cities that have sprung up as if by magic—regard this as little more than an over-grown, antiquated, provincial town. And it is not much consolation to know that we owe this condition of

affairs mainly to the obstinate and unreasoning opposition of a certain class of our own people to anything in the way of progress or improvement.

If the trolley wire were really as dangerous as some people say it is, we would at least have before us the cheering prospect of the speedy extermination by involuntary electrocution of some of these chronic recalcitrants who have so long been the curse of this city.

And I am personally acquainted with many devout Christian people who would look upon such an event as nothing less than a special interposition of Divine Providence.

Now, Philadelphia needs rapid transit so badly that you recently gave permission to build the most objectionable of all structures, an elevated road, all along Market Street, your most important thoroughfare. But at that time the leaders of the present opposition were silent. They never oppose any scheme which they or their friends are in—never.

Capitalists are Shy Birds.

But of course the elevated road has not been built, and will not be built in our generation. Capitalists are shy birds. They never throw their money away—knowingly and deliberately.

Of our population of one million and fifty thousand nearly nine hundred thousand live more than a mile, about five hundred and fifty thousand more than two miles, and over three hundred thousand more than three miles from the great banking and business centres, so that rapid transit of some kind is becoming an absolute necessity.

Philadelphia differs from New York in this respect, that, while that city is built on a narrow strip of territory of great length, so that three elevated railroads and the cable road on Broadway accommodate the great bulk of its population, the area of the city, which is already thickly built up and populated, is four miles from east to west and six miles from north to south. The distance from the southeastern point of this built-up portion to the northwestern is fully eight miles, and

from the southwestern to the northeastern between eight and ten miles. So that even if it were possible to get capitalists to build the two elevated roads which have been projected they would afford relief to only comparatively few people who live along their immediate lines, while the great body of the people would not in any way be benefited, and can never hope to have a sufficient number of elevated roads to do them much good.

If you will look over the map which the opposition has prepared for the purpose of scaring people into signing these protests you will see that the traction system extends into every section of the city, and that, if it could run its cars from one end of the city to the other in half the time it takes to do so, you would immediately have a thoroughly practical system of rapid transit which would accommodate every section and be brought to the very doors of hundreds of thousands of people who can get rapid transit in no other possible way. This very network of roads, which some people regard as such a frightful bugaboo, is just what makes this scheme of rapid transit so thoroughly practicable.

This company proposes to spend from $4,000,000 to $5,000,000 in doing this, not as a matter of economy, but because, if a trip can be made in fifteen minutes which now takes thirty minutes, the increase in the number of passengers carried will yield a fair profit on this additional outlay.

Will Run One-Half Faster.

Of course, nobody expects the cars to run much more rapidly than horse-cars do in crowded parts of the city—and this as a matter of safety to the people on the streets. But this is true to only comparatively few blocks. Elsewhere the speed can be increased with safety, so that, if the experience of other cities is worth anything, the time on all long routes can be shortened nearly or quite one-half. It is the people who have to take long rides who most need rapid transit, and who will be the greatest gainers. Even ten minutes saved twice a day means about thirteen whole working days in a

year, which, at the average rate of wages earned by workingmen, would result in a saving of time equal in value to what they pay for car fare in a year; or, in other words, would be equivalent in value to free transportation twice a day for every working day in the year.

So that it must be perfectly clear that hundreds of thousands of people who now most need rapid transit will be enormously benefited by the passage of these ordinances, and that the increase in the value of real estate on the outskirts and in the suburbs will be simply enormous. Mr. Westinghouse told you that the assessment of all property in Pittsburgh along these lines has been increased fourfold.

Now, what are the objections? They say that the poles are unsightly; that the system is most dangerous to life and limb and property, and that it will cause a great depreciation in the value of property on every street on which it is used. They go further and say that wherever it has been used experience has convinced people generally of its exceedingly dangerous and objectionable character, forgetting the very obvious fact that if such were the case the people who had had such an experience would be rapidly doing away with it, instead of putting it on innumerable new routes as rapidly as the cars can be built.

If the half of these objections were true we certainly ought to hesitate a long time before granting these privileges. But, unfortunately for those who have recklessly or ignorantly made these statements, the most important of them are not true. They have absolutely failed to show a single well-authenticated case in which a human being was ever killed or seriously injured by the current of the trolley wire, or where a single fire was caused by it. The evidence to the contrary is simply overwhelming. So far from its causing an increase in insurance rates or a depreciation in the value of property, you have the testimony of underwriters, real estate men, property-owners, and the mayors of a number of cities—none of whom have the slightest pecuniary interest in this matter or in the trolley system—who all tell you that they have never heard of a case in which there was the slightest

increase in insurance rates or the slightest depreciation in value of a single property, or any complaint whatever from the people after they had seen the system in actual operation, and that with the new and improved motors the noise is not any greater, if as great, as that of horse-cars.

No Longer an Experiment.

Remember that the system is not an experiment; that it is now in actual and successful operation in nearly two hundred and fifty cities and large towns in the United States, among which are the large cities of Boston, Brooklyn, Newark, Rochester, Baltimore, Pittsburgh, Cincinnati, Cleveland, St. Louis, Milwaukee, Minneapolis, St. Paul; that it has been thoroughly tested for several years in Boston, in crooked streets quite as narrow and crowded as any street in this city on which it is proposed to use it, and that in that city alone it is used on two hundred and sixty-one miles of tracks, while here it is proposed to use it on but forty miles, and that over three hundred street railway companies have adopted it at a cost of $155,000,000, on four thousand and sixty-two miles of tracks, with seven thousand one hundred and eighty-one electric cars. They may not like the system, but it is not treating people fairly for our opponents to speak of it now as an experiment. Candid and intelligent men do not usually discuss a subject of such grave importance in this manner. It indicates a deliberate purpose to misrepresent and deceive.

The *Ledger* of yesterday, which has heretofore opposed these ordinances, now frankly admits that the danger to life and limb is not worth talking about. It says: "The truth is that under certain conditions, not often realized, such a current may be dangerous to human life, but that in practice the danger to the lives of the people is so remote that it may be disregarded." In view of this frank admission, look at the position in which thousands of ordinarily truthful people are placed who signed these protests, ignorantly, of course, but solemnly asserting that wherever this system has been tried experience has shown it to be highly dangerous to human life?

Of course, the respectful and truthful people who signed a protest containing such a statement did not know how extensively this system is used, or did not inquire as to what has been the actual experience of people in other large cities.

The *Ledger*, however, dwells on the danger from fire in the event of an electric light or telegraph wire breaking and falling upon the trolley wire. The editor, doubtless, overlooked the fact that no well-authenticated case like this has ever happened on the thousands of miles of tracks on which it is used in nearly two hundred and fifty cities and towns.

Insurance Companies not Scared.

He also overlooked the fact that experts called by the opposition admitted that the use of the protecting wire above the trolley wire to prevent the electric and telegraph wires from coming in contact with it, in case of their breaking and falling, would make the danger of such accidents very slight. He also overlooked the fact that the insurance companies have never regarded the danger as of sufficient account to justify them increasing the rates of insurance a single penny on a single property along the thousands of miles of trolley wire now in operation. He also overlooked the fact that on very few streets where it is proposed to put the trolley wires are there any electric light or telegraph wires which could break and fall, and that, when they are all put under ground, as they will be, accidents of this kind will be wholly impossible. You see even editors sometimes overlook important facts like these when discussing grave subjects.

Does any one suppose that the people of Boston, Brooklyn, Newark, Pittsburgh, Baltimore, Cincinnati, Cleveland, St. Louis, Minneapolis, St. Paul, Milwaukee, and other cities have any less regard for the safety of their property, of their own lives, and of the lives of their wives and children and horses than you have of yours? Does any one suppose that they did not consider these alleged objections and satisfy themselves fully of their baselessness before they permitted the use of this system on their streets?

Does any one suppose that over $155,000,000 of capital would have been invested by street railway companies in constructing this system if its safety and efficiency had not been thoroughly tested, and if they had not been thoroughly satisfied that it was the only practical system in existence? Remember, that for every accident of any of these kinds, the street-car companies would have to pay heavy damages, and that they would not invest millions of dollars in a system that was hazardous.

What is the Use of Talking?

What is the use of talking about storage batteries, when even the professed experts called by our opponents were forced to admit that it was absolutely impossible for companies to use the storage batteries because of their great weight and cost to begin with, and the fact that they wear out in from eight to eighteen months?

What is the use of talking of a cable in view of its cost? If an ordinance were offered to permit this company to dig up all these forty miles of streets and put cables in them there would be a protest ten times louder and more earnest than this.

What is the use in talking about the Buda-Pesth conduit with a slot from one and one-half to one and three-quarters inches wide on our narrow streets, where every team and carriage must use the car-track, and where the snow and ice and water would necessarily destroy the electric current?

What is the use of talking about any conduits when they have all been tried and tested and abandoned as practical impossibilities, in this country, at least?

Of course, Professor Marks, being an electrical expert and inventor, would not admit that one could not be invented which would overcome all the obstacles which, up to this time, have proved insurmountable. How much of practical value there is in the inchoate one which is floating around somewhere in his brain-cells, like the earth in the beginning, "without form and void," is shown by the fact that it has never

yet materialized, and he has not thought it worth his while to apply for letters patent. It is worth absolutely nothing, or it is worth $1,000,000 this very minute. If he had the remotest suspicion that he had invented such a conduit of any practical value no lightning express train between here and Washington would be half fast enough for him.

Oh, but we are told to wait; that some how, some time, some one may invent a storage battery cheap enough to use or a conduit which will work. So some one, some how, some time may possibly "in the sweet by-and-by;" but as soon as the thing is actually done down will come the trolley wires, and that as a cold-blooded matter of business, not as a matter of sentiment.

We have waited, and the people of this city have waited, for rapid transit, lo! these many years. So have hundreds of other similar companies waited, but they have waited in vain for a better system. All the electrical experts and inventors in the world have been trying for years to solve this problem, and millions of dollars have been spent, but thus far all in vain.

Oh, yes, it is all very well for you people who live on aristocratic Walnut Street, and who don't need rapid transit; who love to hear the old-fashioned horse-car go lazily jingling down one street and leisurely dawdling up the other, to say "Wait, wait." But there are nearly half a million less fortunate people than yourself who cannot afford to wait any longer for the remote possibility of some other system materializing in this generation.

So that it must be admitted by all fair-minded people that, judging by the experience of so many other cities, all these objections on the score of danger are widely exaggerated, and that the trolley system, while by no means all that could be desired, is the best yet known.

The Traction Company does not like it any better than you do. But it is with it as it is with you—a clear case of Hobson's choice. They had to do just what you will have to do—choose between the trolley system and the old-fashioned horse-car.

I admit that from a high artistic standpoint these slender standards or poles are unsightly, but I timidly suggest that they will not be nearly as inartistic and unsightly as the multitudinous and massive telegraph and electric light poles which, with hundreds of unsightly and dangerous wires, line, and have for years lined, both sides of Broad Street and our own beloved Chestnut Street. I admit that our beautiful cobble-stone pavements ought not to be thus desecrated, if it be possible to avoid such desecration. I admit that the stately and splendid edifices—the superb creations of the architect's genius—which line South Street and Lombard Street and Bainbridge Street, and many other equally aristocratic and fashionable thoroughfares down in the "Neck" and up in Kensington, could be seen to better advantage if this idea of rapid transit were wholly abandoned.

But this is a very plain, practical world, sadly lacking in "light and sweetness," and with very little of the "true artistic feeling." While a few of our people have cultivated their artistic tastes to such an extent that they are shocked at the idea of permitting the erection of a magnificent equestrian statue of Washington in Independence Square, or of the trolley system on streets upon which they never travel, the great body of our people, to whom rapid transit is an absolute necessity, will gladly accept this as one of the slight inconveniences to which they must submit for the sake of a great public improvement.

ARGUMENT OF JOHN G. JOHNSON, ESQ.

"The question that you have to consider, and the only question which you have a right to consider—and which, I take it, you will consider—is whether, in your judgment, as the representatives, not of Spruce and Pine Streets, or of any particular locality, but of this whole city, it will be for the best interests of the citizens of Philadelphia that you shall pass these ordinances. That is the only question that you can consider, and every other question is as the idle wind, and the discussion of it is a waste of your time.

"And yet Mr. Bullitt and the gentleman specially retained to present the objections of the protestants against this measure, a gentleman thoroughly capable of doing the work, has devoted his whole time, as Mr. Shapley very aptly said, not to that consideration, but to a minute criticism of the wording of the ordinances that have been presented, to a mere discussion of its details, and an appeal to your prejudices and a mere raising before you of a scarecrow as harmless as the one with which the farmer protects his fields. And the excuse that he gives, and the excuse that his junior colleague gives, is that they have not had time! Do not press these things through, they say, with this unseemly haste, but give us time and we will overwhelm the defects of this measure, not with the flimsy objection that they present in every direction, but with the intention of real objections that they think they will find if they have sufficient time.

"You are told that these ordinances are singularly destitute and the bill singularly reprehensible in that you do not prescribe in all the details of the construction of the electric wire system. Which one of you would care to take upon himself the duty and the responsibility of saying by an ordinance how it should be constructed? Where is the ordinance of any of your bodies, your own or your predecessors,

in which you put into the specifications of construction. In this ordinance it is provided that the wires shall be erected under the direction, under the supervision, of the Department of Public Safety. The gentleman would prefer that you would legislate out of existence an officer whom you have created, the head of the Electrical Bureau, who is in the Department of Safety. The gentleman prefers the Director of Public Works. You are asked to say that the department in which the intelligence lies that can supervise this thing shall supervise it, the Department of Public Safety, and that the chief of the Electrical Bureau should supervise this work. We prefer that that should be done, and that you should not pass beyond the general question of whether the citizens demand the thing shall be done, and not undertake to provide the specifications or construction.

The Same Thing Over Again.

"Why, over a year ago, measures substantially similar to these were presented to your Councils. The same gentleman appeared before Councils, and then he said the same thing, for, though I did not attend your meetings, I saw the report of it in the papers. Give us time, he then said, over a year ago, and we will do this thing. How much time does he want? Why, you are twitted with the fact that they have gained so much of the time in which it was your duty to legislate that you are now in the dying hours of your office. You were told over a year ago, 'Give us time,' and you are now asked not to do it at all, so that another Council, ignorant of the subject, may have these objections, worn threadbare now so that you can see through them, before that same Council with the same objections presented, with the same demand for time. Now what does it amount to? Why, says Mr. Bullitt, these ordinances are defective because you do not include within them a proviso that after the expenditure of from $4,000,000 to $5,000,000 in giving this city rapid transit they do not include the proviso that the whole thing, after that expenditure, shall

be torn up whenever Councils shall see fit to demand it. "Why, gentlemen, this is not the first time that a railroad has demanded an ordinance of Councils sanctioning its construction. In all the host of ordinances that you have passed where is there contained in one of them a proviso that after the men, upon the faith of your ordinances, have made their expenditures that the thing shall be torn up at your will? I am reminded in connection with this demand for time that this committee after these ordinances were presented in the month of May visited Boston for the purpose of informing itself, so that it might legislate intelligently. All that is to be thrown away.

The Guarantee of Self-interest.

"Again, gentlemen, not only must this construction be under that supervision, but you have guaranteed for its construction in the best manner that science will permit, that best of all guarantees, self-interest. You may trust that when every other security that can be devised and can be given fails. The men in charge of this enterprise do not any more dare, would no more dare to construct this system without bringing to their aid the best science and knowledge that can be found, than they would dare to fly. Let a single accident happen and let the person injured by that accident, aided by the counsel and the assistants who will endeaver to make a case against the company, let a single person be hurt and with that assistance let there be but a weak point in this construction, let it be able to be proved that there was a single device known to science that could have been used and that was not used, and the effect of that omission will be infinitely greater than any cost of any kind that could be devised.

"I am amazed that in a question that involves the public weal, in a question of this apparent importance, whether the public interest demand this thing or not, that Mr. Bullitt should think it necessary for the purposes of his case, after all this loud parade and blasting of trumpets, and all the scare, should find it necessary to get down and throw mud. It

amounts to nothing more than that to say you should deny to the Traction Company, who come here and ask you to do this thing just because they ask it, and that they should tell you that the Thirteenth and Fifteenth Streets Railway was originally constructed at a cost of $336,000, and its stock is now selling for $3,800,000, and that it pays a dividend of $190,000. Well, gentlemen, where would the city of Philadelphia have been if there had been no street horse passenger railway? And yet Mr. Shapley has shown you their introduction was inveighed against as dangerous to property and life, and that they were introduced only with a struggle, and at that time, when men then advanced their money for their construction, there was as little chance of gain as there is in numberless other things where men have grown colossally rich by doing that which at the time seemed most doubtful.

The Traction Company as a Taxpayer.

"But what is the use of going back to the time when these railways were introduced originally in determining their dividends? Where are the men now that originally constructed them? How many of them are in life, and of those that are in life how few of them own a share of stock. They have entered into the investments of this community, and if the capital stock of the Thirteenth and Fifteenth Street Passenger Railway is now $3,800,000, it represents in this community that much property for which the present holders have paid that much, and the $190,000 that is so much inveighed against is but five per cent. Why, one of the most intelligent of the newspapers which opposed this construction was bought at a time not nearly as distant as the construction of these railways, if report be true, for the sum of $150,000. Would its owners to-day sell it for $2,000,000? The property that the Board of Revision returned when it made its first estimate of values of the property of this city was valued at $300,000,000; to-day it is valued at $700,000,000. Values grow. The men who take their chances, and take them with judgment, make the money, and the capital of

the community represents not what was paid in the days of Penn for all the land upon which Philadelphia is situated, but what is paid for it now and what it is now assessed at for taxation, and this Traction Company that has been so much talked against as reaping colossal profits stands thus in the community as a taxpayer. And upon this subject there is more unintelligent criticism, more throwing of mud without cause, that you can conceive of.

"They say, make these people do as the Mayor of Newark did, who exacted five per cent. upon gross receipts. For the year ending December 31st, 1891, the gross receipts of the Traction Company were $3,541,621. For repairs to streets alone it paid $77,609. It paid to this city in taxes $72,962. It paid to the Commonwealth for taxes $81,071, and it paid for new streets $15,000, an aggregate of $246,643, or seven per cent. on gross receipts, and it paid to its stockholders a dividend two years ago of nothing, one year ago of four per cent., and this year six per cent. upon actual cash paid in, and the gentleman tells us that it owes the city for new Belgian block pavement $209,000, which will raise its taxes to thirteen per cent. and over.

The Traction's Liability.

"And it stands face to face with the liability to pay from time to time for paving with new Belgian blocks forty miles of its streets at a cost of $30,000 per mile, or $1,200,000; and gentlemen who ought to know, and if they do not know they had better learn, have the audacity to say, as if the Traction Company was getting privileges for nothing, whether the public demand it or not, don't give a right to these people unless you make them pay some taxes. And then there is talk about being in arrears and some special fund being short. What does that question of arrears mean? The people who made their money out of the original construction of street passenger railways, as I say, are gone. They are succeeded by others who paid high prices for the stock that they now hold upon the belief that the law was that it was the duty of the passenger railway companies to pave between the rails,

and only to repair the streets outside of the rails, and that it was not their duty to repave the streets whether Councils should demand it or not, and they made a grievous mistake, a grievous mistake of law, when they purchased their property upon that supposition, for the Supreme Court of this State has decided that it is their duty to repave, when the Councils shall demand, the whole of this forty miles of street. But as I said, of course, that is a duty that will be exacted by the city, of paving the other streets in the same way, and the goods sent will be used in adjusting that burden in such a way as to not make it intolerable.

"When they talk about arrears for the past paving, it would be well to inquire in the department of the City Solicitor, and know what the true state of affairs is, which is this: When the city made its claim in the very great uncertainty as to whether it could collect it or not, it filed against every passenger railway which crossed the other, or, as so many do, use the same track, it filed the same bill against all of the passenger railways, and against at least three companies in numerous cases the same bill is charged, and the City Solicitor is now arranging, with the aid of the passenger railways, that the true amount of the bills shall be ascertained, and in one company which is just about to settle the deduction has been exceedingly great.

Settled by the Supreme Court.

"Now what is the use of talking that stuff any more? Can you add anything to the obligation that the Supreme Court of this State has said is one of law? An obligation which they said, interpreting the charter as it has not been interpreted before, as obligatory upon it as a charter obligation—can you add to the law, and why should you therefore when the law has been finally settled by the Supreme Court of this Commonwealth? The matter is in the hands of the City Solicitor, who has energetically pushed the case to a conclusion in which the city has won, and I think you may trust him that after having got the judgment he will see that

as soon as the amount is properly adjusted the execution will issue.

"Then you are told that the Mayor vetoed an electric light ordinance and, therefore, you should not pass this. The difference between the electric light and the trolley system is this: The electric light can go underground and the other cannot.

"But Mr. Bullitt, after having got through that came to the scarecrow part of it, and he flaunted before you his seven thousand two hundred and sixty-three signatures, which represented, as he said, thirty-six thousand people, but under the deft fingers of his junior colleague they have grown to one hundred and eighty thousand. Thank God, there is not a third speaker on that side, or, like the man in buckram, of whom Falstaff spoke, there would have been five hundred and forty thousand if he had talked.

"Now, those were the objections Mr. Bullitt made, and Mr. Smith added to them an unreasonable one, and I do not know how I can deal with that—that the ordinance is defective in that it does not provide for compensation for the trees that may be cut down when the wires are put up.

"After we have paid out four or five millions of dollars, if there are a few trees to go, well!

"Now, how were these signatures obtained? I remember—for all young lawyers go through the experience of practicing by addressing public audiences in little country towns at political meetings—and I remember how in my early youth (I would to God I could return to it, even with the disadvantage of a slim audience) I was invited to speak in a country town. I think it was Doylestown. It was the occasion of my life, and I saw placarded around the town in letters as big as those you have seen on the dirt piles and on the brick-heaps:—

"'Great Political Meeting.

"'Come as the winds come when forests are rendered,
"'Come as the waves come when navies are stranded,'

and I went there and there were three people to hear me. (Laughter.)

"'It is highly important that members of Council (here Mr. Johnson read from an anti-trolley circular) should realize the universal popular repugnance to this scheme, and this can best be obtained at present by a large attendance at this meeting. It is therefore reasonably hoped that you will be present.' Of the one million one hundred thousand thus abjured to be present, how many have cared to come? It is true that they scared out of their retirement Mr. Joshua Bailey and Mr. Lockwood. They were tempted from their seclusion and almost tempted to break that silence they love so well. [Laughter.]

A Cure for Prevarication.

"Why, gentlemen, the day will come—yes, and will come soon—when they will be ashamed of tactics like this. If you have a good cause you need no misrepresentation. My friend, Mr. Shapley, reminds me of a panacea which I saw advertised in the Philadelphia *Times* a few days ago. Some one had discovered bichloride of aluminum which would be a sure cure, if properly injected, for prevarication. (Laughter.) But I do not think a bichloride is strong enough. They want a quinitichloride, or something else.

"But it remained for Mr. Smith to bring out that black map. As if the death-head and cross-bones were not sufficient, he turned it all black. Sympathy! Why, you know if you have a pain in one eye, the other pains, and the citizens of Spruce and Pine Streets feel that the citizens on Chestnut and Walnut Streets would be so sympathetic that they turn black, too, and they have got them all black. But here is a thing they ought to be ashamed of. 'The report of the Massachusetts Railroad Commissioner (here Mr. Johnson again quoted from the anti-trolley circular) shows that for the year ending September 30th, 1891, the number of victims of the trolley system on one company's line in Boston were—that is all black, too—killed fifteen, wounded two hundred and thirty-nine; total, two hundred and fifty-four, and underscored, lest the citizens should not see it.' 'All citizens should unite in the effort to protect Philadelphia from the introduction of a system so destructive to life and property.' Yet in your own hearing the gentleman who volunteered to give these statistics admitted that not one of them was killed or wounded by the electric current. It is inseparable from the doing of business, and of transportation by any system in a crowded city that some men shall be killed and some men shall be wounded, and, great heavens, what would become of our profession if it were not so?

"Does any one pretend to say that more were not killed when the horse-cars were running? There is no doubt that most worthy people—people that many of us love—that more of us respect—have signed this paper believing that the trolley system would be a serious injury to them. That paper is not an emanation of chance. That paper is by order of whom? By order of the Union Committee, opposing traction ordinances for the introduction of trolley wires in Philadelphia, because that one Boston railroad line—and that railroad line has nearly all of Boston's lines—killed that many people, and that, therefore, their lives were in danger. They admit—Mr. Smith admits—that on investigation he finds it is not dangerous. The last *pronunciamento* of the committee is to the effect that the more it is examined the more dangerous it is found to be, and that a united effort should be made to save Philadelphia from the experience of other cities. The bichloride is not strong enough.

After One Year's Protest.

"If there is any harm to be done by it, the materials and the opportunity to discover it, after this year of retaining Mr. Bullitt, ought to be at hand. How did they do it? Mr. Smith admits that he said something wrong about the killing of the boy by a trolley wire in Columbia, where there is no trolley wire. But somebody says that somebody told him that he heard it. That is about the sort of testimony we have had here. It reminds us of the old doggrel, 'And the parson told the sexton and the sexton tolled the bell.' (Laughter.)

"If it were true that danger lurked in this thing, if they had wanted to, how could they have gone about discovering it?

There are two hundred and fifty towns in which it is introduced—some of them the largest cities in the Union. They could have inquired of the mayors of those cities, and if it had been dangerous to life and property they would probably, some of them, have told the truth. This matter has been fought in almost every city, and has been the subject of the most elaborate investigation, and if anything had been discovered they could have ascertained it by this method of procedure. There have been trials in court, there have been men called under oath, and if there was anything dangerous in the system they could have pointed to them.

"Insurance business is done in every city of the Union. If it had increased the risk they could very easily have produced statistics. There are bureaus of vital statistics in all towns, and if there had been deaths or injury to property they could have found it out.

"There are electricians in this country who are not favorable to the trolley system, but who thoroughly understand the electric system of propelling cars. They could have called them. Did they do it? Not one of them did they call. They called two young gentlemen who did not know anything about electricity by profession—I will not say by profession—by trade—who knew everything by profession. They called no man from amongst the great electricians of the country to give you any information upon the subject. Why? Because they very well knew that if they called them they would find nothing in it. This is what they did, yet this was a great emergency.

How Information was Obtained.

"The mayor of Newark had been called to tell you how this system worked, and they felt it necessary to detail their best forces; and the gentlemen who signed this paper as chairman and Mr. Stokes went, like the navigators of the olden time, in search of the Holy Grail. This is the way they went about getting information that would be of value to you. They first went, in order to be sure and solid, to a couple of lawyers to whom Mr. Bullitt sent them. Exhaust-

ing that matter, they stopped people going along the street. They fixed them with a glittering eye like the ancient mariner, and they asked them, unlike the ancient mariner, to tell the tale. And whilst the oysters were stewing Mr. Stokes interviewed the man in charge of the stew-pot. (Laughter.) The result was the exceedingly valuable information they gave you. Since the time of John Phœnix there has never been an investigation like that. He belonged to the United States Coast Survey, and it became necessary for him to know the length of the main street in San Francisco. He was duly armed with a tripod, and, not having any preliminary instruction in the ascertaining of distances, he would put it down there and there and he soon got tired. He found that would not do and he bethought himself of a predometer. He fixed that to the heel of his shoe and it was a great success, until very like Mr. Stokes—for history repeats itself—he went down to so many saloons that the predometer soon measured a thousand miles. (Laughter.) After having exhausted this matter he asked the omnibus driver and was told it was three miles, and that appears in the records of the Coast Survey.

"What is the damage done? What have they shown you? They talk about the disfigurement by the erection of poles, as if three tiny poles in every block would add much to the disfigurement of our main streets. Mr. Shapley has depicted in a way that I cannot equal how much they add to the disfigurement of Shippen and the other streets. What about the disfigurement caused by this Council, which has voted for $20,000,000 which has been spent on the Public Buildings, and has voted that an elevated road shall be put around them. The less talk about disfigurement the better. That was done under the guise of a necessity, and disfigurement cropped out.

Mr. Elverson's Printing-Presses.

"And then, the noise. Why, when these gentlemen told these pathetic tales of the sleepless nights in the hot summer, when they will probably all be out of town—but still, if you are too literal, it will spoil the pathos—when they told their sad and pathetic tales of how they would lie awake at night,

listening to that noise, it reminded me of an attempt to get an injunction to stop a printing-press at the corner of Ninth and Spruce, where the would-be injunctor was a lawyer. He had sworn that the noise of these printing-presses was perfectly intolerable, that his family had no sleep, his wife, who was an exceedingly plump and pretty woman, was worn to skin and bone by sleeplessness, and his baby—he had a great many children—his baby was becoming a skeleton. We were on the eve of having a permanent injunction issued against the establishment, had cost $100,000 to construct, when, in desperation, the court appointed three practical men to go to the premises and investigate. They were entirely disinterested, and some months afterwards they came in with a report that they could hear no noise that in the slightest degree interfered with their comfort, and I ascertained how they arrived at their conclusion. These printing-presses were depicted in the testimony as making a noise like Niagara, and the master, living in the country, had come down to the city and had slept there all night, and found he could not sleep. This was probably due to the lobster salad they gave him. But these three disinterested experts went into the premises and said to Mrs. ———, 'Are the presses running now?' She said: 'I really do not know, but I will send Georgie around to find out.' (Laughter.) That is the sort of a noise we will have here. In consideration of the fact that you have fastened upon me, as a resident of Broad Street, the damnable noise of the omnibuses, I have little sympathy for you if you must hear the little whirring noise which these trolleys may make.

No Danger from Fire.

"Then this danger of fire being introduced into the house. Well, that does require cash outlay to prevent, and I think they had better put this man who agrees to reduce the cost from seventy-five to twenty cents in the ordinance, providing he sticks to his bargain. That there is no danger by fire, Mr. Shapley has already told you. All the testimony concerning these two hundred and fifty cities in which they have the trolley system agrees in showing there has never been an in-

crease in the rate of insurance. Mr. Smith told you he did not know but what they would have to put up the rates of insurance here. What a pity they did not wait a month. Here is a paper received on February 26th, 1892. If it was March 26th, after this ordinance would be passed, this notice would be the result of the introduction of the trolley wire. But unfortunately, they made history a little too early. The Philadelphia underwriters say: 'We hereby agree that all rates as published shall be advanced twenty per cent.—this advance to be applied by members at their counters.'

"There is not a word of testimony that any fires have occurred. No one undertakes to deny that it can be absolutely guaranteed against, and the insurance rates have never been increased. 'Oh,' they say, 'the wires might drop; there might come a storm and that storm, might be a malicious and malignant sort of a storm, and it might sweep under these telephone wires with one grand swoop and sweep it on to the trolley wire, and that infernal and malicious telephone wire, thus impelled in that extraordinary way, might tumble on the trolley wire, and the trolley wire might break, and it might be a stormy night, but notwithstanding the storm that knocked it down it might be dry, and there might be a man under it with, as Mr. Smith suggested, the heart disease—and heaven only knows what would happen. It reminds me of the extraordinary care with which Mrs. Toodles provided against the possibility of Toodles, who was then in fairly good health, unexpectedly dying, and her marrying a man by the name of Thompson—Thompson with a 'p'—and guarding against his dying by buying a coffin plate with 'Thompson' on it—Thompson with a 'p.' There is nothing like taking care of things.

What Edison Swore To.

"Just let me read what no less a man than Thomas A. Edison said, not in a speech—for talk is so easy—but under oath in a judicial proceeding:—

"'Q. What is the voltage of the current employed in operating the Sprague system of single trolley overhead wires?

"'A. About five hundred volts.

"'Q. State whether or not the current so employed is dangerous to the life of human beings or animals, and the reason you have for your statement concerning the same.

"'A. I do not consider five hundred volts as dangerous to either human life or animals, but, by special appliances which have been brought out in the investigation for killing criminals, conducted at my laboratory for the State of New York, I believe it is possible to produce death by a somewhat continued application of five hundred volts.

"'Q. In what form of current supplying that voltage?

"'A. In the continuous current, with the alternating current, &c. As I said, it first required special appliances to the person, and some continued application of the current. These conditions could never arise by accident.

"'Q. Have you testified on this subject of dangerous currents; and, if so, where and before what bodies or courts?

"'A. I have testified before a commission sent by the court in Buffalo in the case of Kemmler sentenced to death by electricity. I have also testified as to experiments conducted for the State before a grand jury in New York City.'

"'They say the values of property will decrease. I know Mr. Courtland Parker, one of the two Newark lawyers. If he had been here and knew the exigencies of the situation he would not have said what was said. He would have been silent on the subject of values. He said the values in the centre of the city had not been diminished, but the values in the suburbs had increased, but not to as great an extent as had been expected. Do you believe that the value of property in the suburbs will not be greatly increased? Do you not know what makes the value of property in the centre of the city? It is the accessibility of the suburbs to the centre of the city. Deprive the Chestnut Street merchants and the other people doing business in the centre of the city of easy access to the centre of the city from the suburbs and the values of their property will decrease.

"The suburbs grow by reason of their easy access to the centre of the city, and the centre of the city grows in value because the suburbs have access to it.

Mr. Farrelly's Bluff.

"Now, on that subject of values, we had some significant testimony from Mr. Farrelly. What brought Mr. Farrelly here I do not know. I think his business affiliations are here. He came here and told you that he would sell his property for $5000 less if this ordinance was passed, and when a written contract was signed—Mr. Bullitt said he would guarantee his offer—both Mr. Bullitt and Mr. Farrelly escaped from the contract in this way: Mr. Farrelly said I did not mean I would sell it for $5000 less than what it was now worth, but $5000 less than what I asked for it some time ago; and Mr. Bullitt escaped from his guarantee by talking about the money-changers in the temple. That was a bad time to quote Scripture. He backed the wager and then he backed out. That is like Mr. Smith's trees. Amid all this wreck there arises to the surface Mr. Smith's trees and the bicycle riders that it would interfere with. I wish to God it would.

Real Advantages of the Measure.

"Now, gentlemen, so much for these perils evolved from the lively imagination of counsel. What are the real advantages of this measure? You have been twitted that some of you are going out of office. This question of rapid transit has unseated many of your members. You have been compelled under this demand, which is louder than the roar of the ocean, to make every interest yield, and you have fastened upon this city by ordinance, under clamor and demand, a most damnable nuisance. Under a demand, imperative, overriding, and dominating, you have been compelled to fasten upon this city the most damnable nuisance that was ever devised—an elevated railroad. You have had to do it under the stress of this demand. Men have lost their seats in Council because they didn't yield to that demand. You have passed an ordinance planting in one of our great business streets an elevated road; and another ordinance planting another on Ridge Avenue, and another on Front Street.

Why? Because it gratified the artistic taste or the æsthetic sense; because it did not injure or destroy the streets? No. Because you were compelled, on account of the demand, to sacrifice the few for the many. What is the result? There is no more possibility of the city of Philadelphia having rapid transit from elevated railroads than there is of a direct interposition of heaven in that respect. It won't pay. However those railways are constructed, they will not pay any person to take charge of them, and to run them, taking into consideration the cost of the plant. They are simply impossible. If they undertook to stop at every square, or midway in a square, then their rapid transit would be slower than a horse-car. No one is going to climb up a high pair of stairs, nor go down a long pair of stairs, in order to reach them. No men are going to sacrifice $10,000,000 to construct a thing which would be a certain loss. That you all know.

"Now, to these Councils there has been a demand made, great and overpowering, that rapid transit shall be afforded. To that demand it has been opposed that great injury would be inflicted. You have been talked to and talked to about this—about these trifling, insignificant disadvantages, as standing in the way of rapid transit. All that you know, because you have heard it here. But, on the other hand, we have called before you here men who, while it is true that they are interested in the business, are men who commended themselves to your judgment by what they said, men whose cross-examination only made their testimony the stronger and more impressive, men whom no one has dared to contradict; you have heard them, and from them you know that there is no possibility of any electric system but the trolley wire giving rapid transit, that the underground system is a myth, and that the storage-battery system is bosh.

What the Trolley System Will Do.

"Now, in giving you this rapid transit, just look at the map. You will pass ordinances to bring West Philadelphia into direct contact with the city, and Darby with West Philadelphia; and ordinances to bring Kensington and Frankford in, and the extreme northwestern portions of the city with the extreme eastern portions and southwestern portions. But, they say, you cannot run more than so many miles an hour. Is it so that God Almighty has decided upon six miles an hour as the absolute maximum of speed? What does rapid transit mean? It means that you are to have something which will enable you to made a combination in time so as to make, as one of the witnesses put it, a combination which will insure greater speed. You cannot have a system by which electric cars will run simply in the outskirts and then have to take on horses in order to run the balance of the route. Nobody would run a road in that way. The people would not submit to the loss of time required for transhipment from the electric cars. The testimony of all the cities which have adopted this plan is that there have always been extensions of the plan—that there are constantly growing extensions of the plan; the fact faces you that when once that plan has been adopted there has never been any recesion from it, so that practical experience has demonstrated the fact that by that system you have real rapid transit from every part of the town.

The Gibe of Comic Papers.

"There are minor advantages of larger and cleaner cars, of an ability to stop more rapidly, of the taking off your streets the filth that comes from the use of horses, and questions of humanity. All these are great, but they constitute minor considerations. On the one hand you have some disadvantages which amount to but little, and on the other hand you have advantages, which are very great. What is the answer to it all? Wait! Wait! Gentlemen, this city has waited too long. At the time of the Revolution this was a great city—a leader in the Union. To-day the comic papers of the country make it a gibe. You have sunk to the third place by the last census, and God only knows where you will sink to by the next. Wait! Wait! You have waited. What

alone enables Philadelphia to hold her place among the great cities of the Union? Her manufactures, her manufacturing industries, in which she still stands in proud pre-eminence. Do you suppose she has attained that by her manufacturers waiting? When they are about to manufacture anything, do they wait because may be some one in the future may discover some better mode of doing things? No. They do the best they can, and take their chances of something better in the future. In this world, gentlemen, the great things do not come to those who wait, but to those who work."

THE TROLLEY SYSTEM.

Used in over two hundred cities in this country—By over three hundred street railway companies—Upon forty hundred and sixty-two miles of track, and operating seventy-one hundred and eighty-one electric cars.

In view of the heated controversy now being waged over the ordinances to permit the use in this city of electric cars propelled by the Trolley System, it will be found interesting to look over the following list of cities where the use of the system has been permitted, and of companies which have adopted and are using it.

It is to be presumed that it has not been adopted by over three hundred street railway companies, at a cost of over $155,000,000, operating seventy-one hundred and eighty-one cars over forty hundred and sixty-two miles of track, and its use permitted by over two hundred cities and large towns, especially cities like Boston, where it has been longest in use, until they were all thoroughly satisfied that the objections now urged against its introduction here were wholly groundless.

List of Cities and Towns Where Electric Roads (Trolley System) are in Operation and Being Constructed.

Location.	Miles of Track.	Cars.
Brooklyn, N. Y.	150	620
Boston, Mass.	261	650
Baltimore, Md.	33	46
Pittsburgh, Pa.	120	246
Cleveland, O.	86	181
St. Louis, Mo.	87	217
Cincinnati, O.	132	285
Louisville, Ky.	45	80
Indianapolis, Ind.	27	31
Rochester, N. Y.	60	100
Syracuse, N. Y.	20	31
Minneapolis, Minn.	127	200
St. Paul, "	75	100
Omaha, Neb.	80	75

Location.	Name of Road.	Miles of track.	Cars.
New Albany . Ind.	New Albany Elec. Ry.	2	6
Indianapolis . "	Citizens St. Ry. Co.	27	31
Richmond . . "	Richmond City Ry. Co	13	16
So. Bend . . . "	So. B. & Mishawaka Ry.	10	16
Terre Haute . "	Terre Haute St. Ry. Co.	8	48
Anderson . . "	Anderson Elec. St. Ry. Co.	2	4
Elkhart . . . "	Elkhart Elec. Ry. Co.	7	11
Lafayette . . "	Lafayette St. Ry. Co.	4	9
Marion . . . "	Marion St. Ry. Co.	10	11
Logansport . "	Logansport Ry. Co.	4	4
Boise City . . Idaho.	Boise Rapid Tran. Co.	3	2
Ottumwa . . . Iowa.	Ottumwa Ry. Elec. & Steam Co.	5	8
Council Bluffs, "	Omaha & C. B. Ry. Co.	20	56
Burlington . . "	The Burlington Elec. Ry. Co.	11	19
Dubuque . . "	Key City Elec. St. Ry. Co.	2	4
Des Moines . "	Des Moines St. Ry. Co.	40	47
Dubuque . . "	Elec. Ry. L. & P. Co.	10	16
Davenport . "	Davenport & Rock Island Ry.	25	50
Davenport . "	Davenport Central Ry. Co.	7	16
Clinton . . . "	State Electric Co.	7	8
Sioux City . . "	Sioux City St. Ry Co.	18	43
Sioux City . . "	S. C. & Riverside Park Ry.	8	11
Kansas City . Kansas	West Side Ry. Co.	4	6
Wichita . . . "	Wichita Elec. Ry. Co	23	25
Ft. Scott . . "	Ft. S. Rapid Tran. Ry. Co.	6	14

Location.	Name of Road.	Miles of Track.	Cars.
Topeka . . . Kansas.	Topeka Rapid Trans. & R. R. Co.	18	30
Kansas City . "	Consolidated City and C. P. Ry	2	4
Paducah . . Ky.	Paducah St. Railway Co.	8	19
Covington . . "	So. Cov. & Cin. St. Ry. Co.	30	22
Maysville . . "	Maysville St. Ry. Co.	4	11
Lexington . "	Passenger & Belt Ry.	12	31
Louisville . . Ky.	Central Pass. Ry. Co.	22	35
Shreveport . . La.	Shreveport Ry. & Land Imp. Co.	5	4
Bangor . . . Me.	Public Works Co.	8	11
Portland . . . "	Portland R. R. Co.	3	7
Augusta . . . "	Aug. Hallowell & Gardner Ry.	8	7
Baltimore . . Md.	No. Ave. Ry. Co.	3	6
Bay Ridge . . "	Bay Ridge Ry. Co.	5	3
Cumberland . "	Cumberland Elec. Ry. Co.	5	18
Lansing . . . Mich.	Lansing City Ry. Co.	8	12
Detroit . . . "	Detroit, Rouge River & D. Ry.	2	1
Neguanee . . "	Neguanee & Ishpeming S. Ry.	3	4
Grand Rapids "	Consolidated St. Ry. Co.	22	41
Adrian . . . "	Adrian City Elec. Belt Ry.	3	3
Saginaw . . . "	Saginaw Union St. Ry. Co.	30	30
Ironwood . . "	Twin City Ry.	3	3
Menominee . "	Menominee Elec. Ry. & P. Co.	4	9
West Bay City "	West Bay City St. Ry. Co.	8	22
Ann Arbor . . "	Ann Arbor St. Ry. Co.	5	7
Marquette . . "	Marquette City & Presque Isle R. C. Ry. Co.	4	5
Battle Creek . "	Battle Creek Elec. Ry. Co.	8	16
Detroit . . . "	Highland Park Ry. Co.	3	4
Muskegon . . "	Muskegon Ry.	13	33
Jackson . . . "	Jackson St. Ry. Co.	12	10
Port Huron . "		5	13
Quincy . . . . Mass.	Manet St. Ry. Co.	4	4
Newburyport . "	Newburyport & Amesbury H. R. R.	20	23
No. Adams . . "	Hoosac Val. Lt. & Ry. Co.	6	7
New Bedford . "	Union St. Ry. Co.	3	12
Marlborough . "	Marlborough St. Ry. Co.	3	6
Gloucester . . "	Gloucester Ry. Co.	9	28
Pittsfield . . . "	Pittsfield Elec. St. Ry. Co.	3	4
Salem . . . Mass.	Naumkeag St. Ry. Co.	37	24
Salem . . . . "	Essex Elec. St. Ry. Co.	5	6
Newburyport . "	Black Rks. & Salisbury Beach St. Ry. Co.	21	3
Lawrence . . "	Mernmack Valley St. Ry. Co.	18	16
Borckton . . . "	East Side St. Ry. Co.	10	14
Holyoke . . . "	Holyoke St. Ry. Co.	7	26

Location.	Name of Road.	Miles of Track.	Cars.
Revere . . . . Mass.	Boston and Revere Elec. Ry. Co. .	4	5
Leicester . . . "	Worcester, Leicester & Spenser St. Ry. Co.	13	16
West Bay C. . Mich.	West Bay City St. Ry. Co.	9	22
West Newton . Mass.	Newton St. Ry. Co.	5	21
Plymouth . . "	Plymouth & Kingston St. Ry. Co. .	6	5
Quincy . . . . "	Quincy & Boston St. Ry. Co. . . .	9	14
Springfield . . "	Springfield St. Ry. Co.	23	44
No. Attleboro . "	A. No. A. & Wenthan St. Ry. . . .	6	19
Lynn . . . . "	Lynn Belt Line St. Ry. Co. . . .	10	20
Helena . . . Mont.	Helena Elec. Ry. Co.	9	17
Butte . . . . "	Butte Consolidated Ry. Co. . . .	18	29
Helena . . . "	Helena Elec. Ry. Co.	8	19
Anaconda . . "	Elec. Ry., Light & Power Co. . . .	5	20
Great Falls . . "	Great Falls St. Ry. Co.	9	9
Sault St. Marie, Mich.	S. S. M. St. Ry. Co.	4	5
Stillwater . . Minn.	Stillwater St. Ry. Co.	5	6
St. Paul . . . "	St. P. City Ry. Co.	75	100
Duluth . . . . "	Motor Line Imp. Co.	3	4
Duluth . . . . "	Duluth St. Ry.	28	41
Kansas City . Mo.		11	8
Helena . . . Mont.	Helena Elec. Ry. Co.	8	15
Joplin . . . . Mo.	Joplin E. Ry. & Motor Co.	5	10
St. Joseph . . "	Union Ry. Co.	11	34
St. Joseph . . "	Wyatt Park Ry. Co.	15	22
Kansas City . "	North East Ry. Co.	7	12
Springfield . . "	Metropolitan Elec. Ry. Co.	7	50
Lebanon . . . Mo.	Lebanon Light & Water Co.	1	
Hannibal . . "	Hannibal Ry. Co.	2	10
Kansas City . "	Metropolitan St. Ry. Co.	12	46
Sedalia . . . "	Elec. Ry. Light & Power Co. . . .	8	20
Fredonia . . . N. Y.	Dunkirk & Fredonia R. R. Co. . .	3	8
Elmira . . . . "	Elmira & Horsehead Ry.	14	10
Amsterdam . "	Amsterdam St. Ry. Co.	4	9
Hudson . . . "	Hudson Elec. Ry. Co.	2	4
Utica . . . . "	Utica Belt Line St. Ry. Co. . . .		50
N. Towanda . "	Towanda St. Ry. Co.	3	3
Albany . . . "	Albany Ry.	16	32
Watertown . . "	Watertown St. Ry. Co.	3	8
Watertown . . "	Watertown & Brownville St. Ry. . .	3	8
Glen Falls . . "	G. F., Sandy Hill & Ft. Edward . .	8	12
Auburn . . . "	Auburn City Ry. Co.	27	10
Charlotte . . "	Grand View Beach Ry.	8	14
Albany . . . "	Watervleet, Turnpike & R. R. . . .	7	36
Oswego . . . "	Oswego St. Ry.	11	15

Location	Name of Road.	Miles of Track.	Cars.
Saratoga Spgs., N. Y.	Saratoga Elec. Ry.	2	2
Flushing . . . "	Flushing & College Pt.	4	9
Troy . . . . . "	Troy & Langinsburg Ry.	33	61
Utica . . . . "	Utica & Mohawk Ry.	3	14
Jamestown . . "	Jamestown St. Ry. Co.	20	23
Seneca Falls . "	Seneca Elec. Ry.	3	4
Binghamton . "	Binghamton St. Ry. Co.	14	18
Charlotte . . "	Rochester Elec. Ry.	5	21
Asheville . . N. C.	Ashville St. Ry. Co.	6	11
Raleigh . . . "	Raleigh St. Ry. Co.	5	8
Asheville . . "	West Asheville & Sulphur Spgs. . .	4	2
Winston . . . "	Winston-Salem Elec. & Ry. Co. . .	7	9
Charlotte . . "	Charlotte Elec. Ry.	4	10
Trenton . . . N. J.	Trenton Pass. Ry. Co.	21	31
Passaic . . . "	Passaic, Garfield & Clifton	4	4
Newark . . . N. J.	Newark Pass. Ry. Co.	25	
Paterson . . . "	Paterson Ry. Co.	24	
Atlantic City . "	Camden & Atlantic R. R. Co. . . .	7	40
Jersey City . . "	Jersey City & Bergen Ry.	52	5
Camden . . . "	Camden Horse Ry. Co.	7	14
Asbury Park . "	Seashore Elec. Ry. Co.	4	21
Concord . . . N. H.	Concord St. Ry. Co.	9	11
Dover . . . . "	Union St. Ry.	7	15
Plattsmouth . Neb.	Plattsmouth St. Ry. Co.	3	2
Lincoln . . . "	Lincoln City E. Ry. Co.	15	8
Lincoln . . . "	Lincoln St. Ry. Co.	37	85
Norfolk . . . "	Norfolk Elec. St. Ry. Co.	2	
Kearney . . . "	Kearney Elec. Co.	7	4
Portland . . . Ore.	Multnomah St. Ry. Co.	5	33
Salem . . . . "	Capitol City Ry.	4	8
Portland . . . "	Metropolitan Ry. Co.	6	
Portland . . . "	City & Suburban	15	18
Portland . . . "	Waverly & Woodstock Ry.	8	7
Portland . . . "	Badge Ry. Co.	10	15
Astoria . . . "	Astoria St. Ry. Co.	3	8
Newark . . . Ohio.	Newark & Granville St. Ry.	8	10
Dayton . . . "	Dayton & Soldiers' Home Ry. . . .	6	4
Alliance . . . "	Alliance St. Ry.	2	3
Columbus . . "	Glenwood & Green Lawn Ry. . . .	4	12
Salem . . . . "	Salem Elec. Ry. Co.	3	6
Akron . . . . "	Akron St. Ry. Co.	12	35
Columbus . . "	Columbus Consul St. Ry.	36	88
Youngstown . "	Youngstown St. Ry.	6	14
Lima . . . . "	Lima St. Ry. Motor & Power Co. . .	4	14
Defiance . . . "	Defiance L. & P. Co.	3	2

Location.	Name of Road.	Miles of Track.	Cars.
Sandusky . . Ohio.	Sandusky St. Ry. Co.	7	8
Ashtabula . . "	Ashtabula Rapid Tran. Co.	4	9
Newark . . . "	Newark City Ry. Co.	5	19
Canton . . . "	Canton St. Ry. Co.	8	19
Piqua . . . . "	Piqua City Ry. Co.	4	6
Toledo . . . "	Toledo Elec. St. Ry. Co.	24	35
Dayton . . . "	White Line St. Ry. Co.	17	25
Findlay . . . "	Findlay St. Ry. Co.	4	10
Steubenville . "	Steubenville St. Ry. Co.	2	6
Springfield . . "	Springfield Elec. Ry.	5	6
Liverpool . . "	E. Liverpool & Wellsville Ry. . . .	8	8
Mansfield . . "	Citizens' Elec. Ry. Co.	5	5
Toledo . . . "	Toledo Consolidated St. Ry.	58	49
Hamilton . . "	Hamilton & Lindenwald Ry.	8	14
Ashland . . . Pa.	Mah. City, Shen., Girardville	18	4
Uniontown . . "	Uniontown St. Ry. Co.	3	4
Pittsburgh . . "	Du Quesne Traction Co.	28	55
Pittsburgh . . "	Penn Inclined Ry.		
Pittsburgh . . "	Pittsburgh, Allegheny & Manchester St. Ry.	18	55
Pittsburgh . . "	Second Ave. Ry. Co.	15	20
Pittsburgh . . "	Citizens' Trac. Co.	10	20
Pittsburgh . . "	P. Knoxville & St. Clair Ry	2	4
Pittsburgh . . "	Suburban Rapid Tran. Co.	2	7
Pittsburgh . . "	P. Federal St. & Pleasant Val. . . .	42	55
Pittsburgh . . "	Pittsburgh & Birmingham	3	30
Pottsville . . . "	Schuyler Elec. Ry. Co.	6	13
Reading . . . "	Neversink Mtn. Ry. Co.	8	12
Reading . . . "	E. Reading Ry. Co.	5	9
Reading . . . "	Reading & S. W. St. Ry.	5	8
Connellsville . "	Connellsville, New Haven & Leisenring St. Ry.	5	4
New Castle . . "	New Castle Elec. St. Ry. Co. . . .	2	4
West Chester . "	West Chester St. Ry. Co.	6	5
Du Bois . . . "	Du Bois Trac. Pass. Ry. Co.	2	3
Williamsport . "	Williamsport Pass. Ry. Co.	6	8
Johnstown . . "	Johnstown Pass. Ry. Co.	15	20
Braddock . . "	Braddock & Turtle Creek Ry. . . .	3	3
Braddock . . "	Braddock Elec. Ry. Co.	4	4
Scranton . . . "	Scranton Suburban Ry.	9	8
Lebanon . . . "	Lebanon & Annville St. Ry.	9	6
McKeesport . "	McKeesport & Reynoldton Ry. . .	5	
Wilkesbarre . "	Wyoming Valley Traction Co. . . .		
Lancaster . . "	Lanc. City & W. End St. Ry. . . .	15	26
Scranton . . . "	People's Ry. Co.	27	42

Location.	Name of Road.	Miles of Track.	Cars.
Greensburg . Pa.	Greensburg & Henrysville Ry. . .	2	3
Erie . . . . . "	Erie Elec. Motor Co.	17	31
Shamokin . . "	Shamokin St. Ry. Co.	2	3
Washington . "	Washington Elec. St. Ry. Co. . . .	3	4
Altoona . . . "	City Pass. Ry. Co.	6	12
Harrisburg . . "	E. Harrisburg Pass. Ry.	11	50
Easton . . . . "	Penna. Motor Co.	14	6
Allentown . . "	Allentown & Bethlehem Rapid Tran.	15	22
Beaver Falls . "	B. Falls Traction Co.	8	10
Newport . . . R. I.	Newport St. Ry. Co.	4	23
Providence . . "	Union R. R. Co.	7	12
Nashville . . Tenn.	Citizens' Rapid Trans. Co.	4	5
Nashville . . "	United Elec. Ry. Co.	52	66
Memphis . . . "	Citizens' St. Ry. Co.	30	40
Memphis . . . "	City & Suburban Ry.	5	12
Chattanooga . "	Chattanooga & No. Side Ry.	4	4
Bristol . . . . "	Bristol Belt Line Ry.	9	11
Chattanooga . "	No. Chattanooga St. Car Co.	3	3
Knoxville . . "	Knoxville Elec. Ry. Co.	13	30
Chattanooga . "	Chattanooga Elec. Ry. Co.	38	38
Johnson City . "	J. City & Carnegie St. Ry.	3	3
Pawtucket . . R. I.	Pawtucket St. Ry.	5	4
San Antonio . Tex.	Rapid Trans. St. Ry. Co.	5	3
San Antonio . Tex.	West End St. Car Co.	5	5
Fort Worth . "	Riverside St. Ry. Co.	2	3
Laredo . . . "	Laredo Imp. Co.	6	8
Waco . . . . "	Citizens' Ry. Co.	10	10
Waco . . . . "	Waco El. Ry. & Light Co.	6	5
Austin . . . . "	Austin Rapid Tran. Co.	13	14
Sherman . . . "	College Park Rapid Tran. Co. . .	4	5
Dallas . . . . "	No. Dallas Circuit Ry. Co.	3	5
Dallas . . . . "	Dallas Con. Pass. Ry. Co.	23	32
San Antonio . "	San Antonio St. Ry. Co.	30	55
Galveston . . "	Galveston City Ry. Co.	38	34
San Antonio . "	Alamo Elec. St. Ry. Co.	8	20
Houston . . . "	Houston City St. Ry. Co.	15	30
Dallas . . . . "	Dallas Rapid Tran. Co.	13	9
Fort Worth . "	No. Side Ry. Co.	12	15
Fort Worth . "	Ft. W. & Arlington Heights Ry. . .	6	7
Ogden . . . . Utah	Ogden City St. Ry. Co.	10	20
Salt Lake . . "	Salt Lake City Ry.	28	52
Salt Lake . . "	Salt Lake Rapid Tran. Co.	26	32
Richmond . . Va.	Richmond Ry. & Elect. Co.	41	73
Richmond . . "	Richmond & Manchester Ry. . . .	5	10
Hampton . . "	Hampton & Old Pt. Ry. Co. . . .	18	14

Location.		Name of Road.	Miles of Track.	Cars
Danville . . .	Va.	Danville St. Car Co.	2	4
Lynchburg . .	"	Rivermont Co.	3	4
Anacortes . .	Wash.	Fidalgo & Anacortas Ry.	12	4
Whatcom . .	"	Bellingham Bay Elec. St. Ry. . . .	3	7
Tacoma . . .	"	Tacoma Ry. & Motor Co.	23	26
New Whatcom	"	Bellingham Elec. St. Ry.	4	4
Tacoma . . .	"	Tacoma & Steilacoom Ry.	13	7
Spokane . . .	"	Arlington Heights Ry. Co.	2	1
Spokane . . .	"	Ross Park St. Ry. Co.	4	7
Spokane . . .	"	City Park Tran. Co.	7	5
Pt. Townsend,	Wash.	Pt. Townsend St. Ry. Co.	4	3
Seattle	"	Union Trunk Line	13	16
Seattle	"	Rainier Power & Ry. Co.	2	2
Seattle	"	Green Lake E. Ry. Co.	4	2
Seattle	"	West St. & No. End Ry. Co. . . .	6	14
Seattle	"	Seattle Con. St. Ry. Co.	22	48
Huntington .	W. Va.	Huntington E. L. & St. Ry. Co. . .	3	14
Wheeling . .	"	Citizens' Ry. Co.	10	
" . .	"	Wheeling Ry. Co.	12	25
Martinsburg .	"	Martinsburg St. Ry. Co.	3	3
Marinette . .	Wis.	Marinette Gas E. L. & Ry.	4	5
Milwaukee . .	"	Milwaukee Elec. Ry. Co.	19	22
Eau Claire . .	"	Eau Claire St. Ry. L. & P. Co. . . .	9	17
W. Superior .	"	Douglass Co. St. Ry.	9	22
Milwaukee . .	"	West Side Elec. Ry.	12	80
Merrill	"	Merrill Ry. & Light Co.	5	3
Appleton . .	"	Appleton Edison Elec. Co.	7	8
Vancouver . .	B. C.	Vancouver E. Ry. & Light Co. . . .	10	10
Victoria . . .	"	National Elec. Tramway	15	17
Windsor . . .	"	Sandwitch, Windsor & Amhurstburg Ry. Co.	6	12
Winnipeg . .	Can.	Winnipeg St. Ry. Co.	4	10
Ottawa . . .	"	Ottawa Elec. St. Ry. Co.	12	16
Total . .		. . . . .	4062	7181

Baltimore Councils have just granted the privilege to construct the trolley system on the railways of that city.

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